REVISED FINAL REPORT

2010 URBAN WATER MANAGEMENT PLAN

CITY OF BRENTWOOD, CALIFORNIA

PREPARED WITH ASSISTANCE FROM

ICF International

May 12, 2011
Updated: October 25, 2013

LIST OF PREPARERS

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ICF International

City of Brentwood. 2011. *2010 Urban Water Management Plan*. Revised Draft Report. October 25. Brentwood, CA. Prepared with assistance from ICF International, Sacramento, CA.

2010 Urban Water Management Plan

ICF International has worked closely with the City of Brentwood (City) to develop this 2010 Urban Water Management Plan (UWMP), as required by the Urban Water Management Planning Act (CWC Section 10610). Since 2005, the City has been implementing the conservation measures put forth in its 2005 UWMP. However, it now must meet the more stringent water management targets of Senate Bill (SB) x7-7, the Water Conservation Act of 2009, a goal of which is a 20% statewide reduction in urban per capita water use by 2020. Compliance with UWMP requirements is overseen by the California Department of Water Resources (DWR).

The 2010 UWMP introduces the plan's purpose and development process, describes the existing water distribution system, summarizes historical water demand and estimates future water demand, describes system supplies and opportunities for water use reduction, introduces the City's water shortage contingency plan, and summarizes the City's demand management practices.

The City, with a 2010 service area population of 51,394, supplies water to approximately 16,000 water connections. The City's distribution system consists of three pressure zones; one wastewater treatment plant (WWTP); one potable water treatment plant, which was brought online in 2008; nine active groundwater wells; six water reservoirs; seven water booster pump stations; and 172 miles of water mains within the city limits. The City also purchases potable water from the Contra Costa Water District's (CCWD's) Randall-Bold Water Treatment Plant (RBWTP) and raw water from the East Contra Costa Irrigation District (ECCID). The City WWTP has produced recycled water for raw use since 2005.

According to the Water Conservation Act of 2009, the 2020 water use target will be calculated by using one of four methods. As an individual urban water retailer, the City has chosen Method 1 for its water use target, which aims to reduce consumption to 80% of the City's baseline per capita water use by 2020. To calculate this water use target, the City used gross water use data for the 10-year baseline period of 2001 to 2010. The City's annual baseline water use for this 10-year period was calculated as 235 gallons per capita per day (GPCD). The 10-year baseline water use targets were calculated as 211 GPCD by 2015 and 188 GPCD by 2020. Water use projections were estimated by using service area population projections provided by the City's Finance Department, which relied on estimates from the California Department of Finance.

One of the primary methods the City plans to reduce water use is through an increase in recycled water use. The City started to develop and deliver recycled water supplies in 2005. Recycled water use was subtracted from water use sector data (landscape and industrial) to reflect gross water use calculations adequately. Data reveal a decrease in recycled water deliveries between 2005 and 2010 because one of the largest recycled water users, Sunset Park, requested potable water for landscape irrigation. However, the City has also increased its recycled water accounts since 2005, growing from one customer to six customers, and the numbers still appear to be increasing. The plan concludes that the City will meet the 2015 and 2020 water use targets while delivering an adequate supply of water to its customers over the next 20- to 25-year planning period. The City's water use in 2010 was significantly lower than previous years. Thus, no reduction in use is needed to meet the 2015 or 2020 water use targets. However, reductions will be made by the City to maintain the 2020

water use target in future years. These reductions can be made primarily with increased use of recycled water in the landscape sector, such as existing and future parkways and golf courses, as well as through City fire hydrant use, which is included in the "other" water use sector. The City also plans to continue implementing several measures to reduce unaccounted-for water use volumes, such as repairing old water infrastructure to prevent from system leaks, efforts to reduce unauthorized connections, as well as meter replacement and addition. Water reductions will also continue to be made thanks to the City's successful water conservation program and further implementation of water-efficient technologies and practices. In addition, the City will continue its outreach and education efforts for residents, such as water audits and leak detection and prevention, and the City plans to upgrade its automatic meter reading system with a radio frequency wireless fixed base system that transmits information four times a day.

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Acronyms and Abbreviations

°F	degrees Fahrenheit
BMP	best management practice
BWWTP	City of Brentwood Wasterwater Treatement Plant
CCWD	Contra Costa Water District
City	City of Brentwood
COBWTP	City of Brentwood Water Treatment Plant
CUWCC	California Urban Water Conservation Council
CWC	California Water Code
Delta	Sacramento–San Joaquin River Delta
DMMs	demand management measures
DOST	California Department of Water Resources' online submittal tool
DRU	Demographic Research Unit
DWR	California Department of Water Resources
ECCID	East Contra Costa Irrigation District
GPCD	gallons per capita per day
LAFCO	Local Area Formation Committee
mgd	million gallons per day
mgy	million gallons per year
mg/L	milligrams per liter
MOU	memorandum of understanding
RBWTP	Randall-Bold Water Treatment Plant
SB	Senate Bill
SCADA	Supervisory Control and Data Acquisition
State Water Board	State Water Resources Control Board
TDS	total dissolved solids
UWMP	Urban Water Management Plan
UWMP Act	Urban Water Management Planning Act
WRCC	Western Regional Climate Center
WWTP	wastewater treatment plant

Chapter 1
Introduction

Purpose

The purpose of this Urban Water Management Plan (UWMP) is to ensure efficient use of urban water supplies in the City of Brentwood (City) and promote conservation. The UWMP discusses not only the availability of water but also water use, reclamation, and water conservation activities. This UWMP complies with the Urban Water Management Planning Act (UWMP Act) (California Water CWC Section 10610 et seq.), the Water Conservation Act of 2009 (CWC Section 10608), and the 20x2020 Water Conservation Plan, which are being implemented by the California Department of Water Resources (DWR) (California Department of Water Resources 2010).

Since 2005, the City has been implementing the conservation measures put forth in its 2005 UWMP. However, numerous relevant state laws have changed since that time. For example, with enactment of the Water Conservation Act of 2009 and other legislation, the UWMP Act has changed. Therefore, the City now must meet the more stringent water management targets of the Water Conservation Act of 2009.

Urban Water Management Planning Act

The City's UWMP was prepared as required by the UWMP Act (Appendix A), which states that any urban water supplier that provides water to 3,000 or more customers, or more than 3,000 acre-feet of water annually, should make every effort to ensure the appropriate level of reliability in its water service to meet the needs of its various categories of customers during normal, dry, and multiple dry years. The UWMP Act outlines the required contents of the UWMP and describes how urban water suppliers should adopt and implement the plan.

The overall intent of the UWMP Act is for urban water suppliers to document their water supplies and conservation efforts. The primary changes to the UWMP Act since 2005 are related to water conservation (through Water Conservation Act of 2009) and demand management measures (DMMs) (through Assembly Bill 1420). Several other changes are described in Table B-1 of Part II, Section B, of the draft *Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan* (California Department of Water Resources 2011b).

The Water Conservation Act of 2009

In November 2009, Senate Bill (SB) x7-7, the Water Conservation Act of 2009, was signed into law as part of a comprehensive water legislation package. This legislation, which addresses both urban and agricultural water conservation, sets a goal of achieving a 20% statewide reduction in urban per capita water use and directs urban retail water suppliers to set 2020 urban water use targets (20x2020).

The Water Conservation Act of 2009 requires certain information to be included in the UWMP of an urban water supplier. For example, it requires the supplier to report base daily per capita water use (baseline), urban water use target, interim urban water use target, and compliance daily per capita water use estimates. The bill directs DWR to develop technical methodologies and criteria to ensure

the consistent implementation of the act and provide guidance to urban retail water suppliers with respect to developing baseline and compliance water use. These technical methodologies, which are described in the *Methodologies for Calculating Baseline and Compliance Urban per Capita Water Use* document (California Department of Water Resources 2011a), were developed through a public process with stakeholder input.

20x2020 Water Conservation Plan

The final 20x2020 Water Conservation Plan was released by DWR in February 2010 in response to the urban provisions in the Water Conservation Act of 2009. The 20x2020 Water Conservation Plan developed estimates of statewide and regional baseline per capita water use and outlined recommendations to the governor regarding how a statewide per capita water use reduction plan could be implemented. In addition to the 20x2020 Water Conservation Plan, DWR and the State Water Resources Control Board (State Water Board) convened the 20x2020 Agency Team on Water Conservation.

The need for a 20x2020 Water Conservation Plan was presented initially in February 2008 when Governor Arnold Schwarzenegger introduced a seven-part comprehensive plan for improving the Sacramento–San Joaquin River Delta (Delta). A key component of his plan was a goal to achieve a 20% reduction in per capita water use statewide by 2020. The governor's inclusion of water conservation in the Delta plan emphasizes the important role conservation plays in reducing demand on the Delta and the overall California water supply.

Previous Reports

Several reports have been prepared that address issues related to water supply and demand for the City. An understanding of the results of these previous studies will provide a broader context for preparing an updated water supply plan for the future.

2005 Urban Water Management Plan

The City's 2005 UWMP was prepared by Brown and Caldwell and submitted to DWR on January 4, 2006 (City of Brentwood 2006b). The plan concluded that the water supplies that are available to the City's water transmission system, as well as its customers, would be adequate over the next 20-year period. The City's ongoing water conservation program and planned conservation measures were presented in the 2005 plan. The City has implemented several of these measures in the last 5 years. In addition, the new City of Brentwood Water Treatment Plant (COBWTP) became operational in 2008, which provides an additional 16,162 acre-feet of capacity per year and reduces the City's need for water supplies from the Randall-Bold Water Treatment Plant (RBWTP). The City also has a strong water recycling program.

2006 Water Master Plan

The City adopted its most recent Water Master Plan: Model Update, Water System Analysis, and Water System Facilities in March 2006 as a technical memorandum (City of Brentwood 2006a). The technical memorandum provides an update regarding system-wide water demand, the model, planning criteria, water system analysis, and water system facilities (existing and future facilities).

2007 Water and Wastewater Municipal Services Review

In 2007, the Contra Costa Local Area Formation Committee (LAFCO) produced its *Water and Wastewater Municipal Services Review for East Contra Costa County* report, which was approved in December 2007 (Contra Costa Local Area Formation Committee 2007). Section 3.0 of the report addresses the City's water and wastewater services and provides an overview of the City's water services, growth and population projections, infrastructure needs, water supply and demand, water infrastructure, and financial constraints and opportunities for existing and planned water services.

2001 General Plan

The current general plan was adopted in 1993 and updated in 2001 (City of Brentwood 2001). It now covers the time period from 2001 to 2021. The plan describes the current state of the City and describes the City's vision through 2021. It includes growth projections as well as land use, economic development, housing, and other elements relevant to this UWMP. The City's 2001 General Plan states the following policies for water conservation:

POLICY 1.3—Provide incentives for water conservation measures in new housing (p. 2-21).

> In fulfilling this policy, the City has committed to continue implementation of the City's water conservation program. The program promotes the use of water conservation devices in existing structures, including low-flow toilets and showerheads, and water-conserving landscaping. The City requires the submission of landscape plans in conjunction with all residential developments. Plans are reviewed to ensure the use of drought-tolerant plant materials and reduce the use of turf in all front yards. The City also reviews proposed irrigation details, inspects installation, and checks the timing of automatic sprinklers to ensure that front-yard irrigation is conducted efficiently.

The following goals and policies were also established to address the City's plans for conservation and open space in its planning area:

> **Goal 4:** Conserve Water. Ensure that water resources are used efficiently (pages IV. 1-2 and IV. 1-6)

POLICY 4.1—Water Conservation: Promote the conservation of water.

> **4.1.1**—New Development: Require new development to incorporate water-efficient fixtures into design and construction.
>
> **4.1.2**—Decrease Use: Provide incentives for water users to decrease consumption.
>
> **4.1.3**—Landscape Ordinance: Implement a water-conserving landscape and irrigation ordinance.
>
> **4.1.4**—Public Education: Educate the public regarding ways to reduce water consumption and advantages of water-conserving landscaping.

POLICY 4.2—Reclaimed Water: Promote the use of reclaimed water and other raw water sources.

> **4.2.1**—Dual Water Systems: Encourage large-scale developments and golf course developments to incorporate dual water systems.
>
> **4.2.2**—Incentives: Provide incentives to developers and individuals who use reclaimed water and other raw water for landscaping.

4.2.3—Agency Coordination: Work with other public agencies.

Chapter 2
Plan Preparation

Coordination

Coordination efforts are conducted to (1) inform other agencies of the activities of the City, (2) gather high-quality data for use in developing this UWMP, and (3) coordinate planning activities with other related regional plans and initiatives. The City coordinated with several stakeholders in the preparation of this UWMP. Legal public notices for city council adoption hearings were published in local newspapers and posted at City facilities. Copies of the public hearing notices are included in Appendix B. Table 2-1 summarizes the efforts the City has taken to include additional agencies and citizens in its planning and preparation process.

Table 2-1 (DWR Table 1). Coordination with Appropriate Agencies

Table 1 Coordination with Appropriate Agencies							
Coordinating Agencies	Participated in Developing the Plan	Commented on the Draft	Attended Public Meetings	Was Contacted for Assistance	Was Sent a Copy of the Draft Plan	Was Sent a Notice of Intention to Adopt	Not Involved/ No Information
CCWD					X	X	
ECCID					X	X	
Brentwood WWTP	X	X		X	X	X	
General Public			X	X		X	
Contra Costa County					X	X	
Other						X	
Notes: CCWD = Contra Costa Water District. ECCID = East Contra Costa Irrigation District. WWTP = wastewater treatment plant.							

Public Participation

The public participation process provides an opportunity for City residents and employees to learn about the City's water supply, conservation goals, and plans for providing a reliable, safe, high-quality water supply for the future. The following public outreach activities will occur as part of the City's 2010 UWMP development process:

- **2010 UWMP Pre-Adoption Hearing:** Prior to the adoption hearing, the City will hold a pre-adoption hearing to discuss the 2010 UWMP, present and future measures, and programs and policies to help achieve the water use reductions. In addition, the City will maintain the draft UWMP on its web site and a hard copy at its offices.

- **Public Release of Final 2010 UWMP:** The City will respond to public comments on the 2010 UWMP and release a draft to be adopted at the adoption hearing.
- **2010 UWMP Adoption Hearing:** At this public hearing, the City will officially adopt the City's 2010 UWMP (Deadline: July 1, 2011).
- **Submit UWMP to DWR, the California State Library, and City/County that Receives Water from Supplier:** Within 30 days of adoption of the UWMP, the water supplier must submit the plan, as well as copies of changes or amendments, to DWR, the California State Library, and any city or county within which it supplies water (Deadline: July 30, 2011).
- **Provide Copy of UWMP for Public Review:** The water supplier must provide a copy of the adopted UWMP for public review during normal business hours for the 30 days that follow its submission to DWR (Deadline: August 31, 2011). The UWMP is available online at the City's website http://www.brentwoodca.gov
- **Provide Copies of UWMP to Supplied Entities:** The water supplier must provide the reliability section and supply-and-demand section of the adopted UWMP to any city or county within which the supplier provides water within 60 days after submitting the adopted UWMP to DWR (Deadline: September 30, 2011).

This UWMP was subsequently revised based on comments from DWR, and adopted by the City of Brentwood City Council.

Plan Adoption, Submittal, and Implementation

The UWMP will be adopted, submitted, and implemented according to UWMP Act requirements. The deadline for adoption of a water supplier's 2010 UWMP is July 1, 2011 (CWC Section 10608.20). This date is extended from the normal requirement of December 31 in years ending in five or zero (CWC Section 10621(a)) to allow additional time for water suppliers to address UWMP requirements of the Water Conservation Act of 2009.

The 2010 UWMP submission deadline to DWR is July 31, 2011. The 2010 UWMPs may (but are not required to) be submitted to DWR by uploading them on the Internet. DWR's online submittal tool (DOST) is still in development and not yet available to the public. Data used to generate the 2010 UWMP tables can also be submitted to DWR through DOST.

The UWMP Act requires submittal of applicable supporting documents. Documents that may be considered a part of a UWMP include:

- A copy of the resolution adopting the UWMP.
- A copy of the draft water shortage contingency resolution or ordinance. The California Urban Water Conservation Council (CUWCC) best management practice (BMP) reports, which may be submitted as DMM documentation.
- A copy of the order or decree adopted by the court or the State Water Board for adjudicated basins and a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree. This documentation may be provided separately from the submitted UWMP.

The City plans to use the schedule below for the plan preparation and submittal process (Table 2-2).

The City is included in DWR's North Central Region. The North Central Region office will review the UWMP to determine whether each required element is fully addressed. DWR staff members will complete the review using the 2010 Review of Completeness Form (Appendix C), which will become part of the UWMP record after the review process is complete. Chapter 10 of this UWMP contains a UWMP Checklist.

After the UWMP review is completed, DWR will send a letter to the water supplier, either indicating that the plan is complete or specifying the area or areas in which further information is required. This will be in addition to the electronic notification sent through DOST. If additional information is required, it must be provided before the water supplier can be eligible for grants or loans.

Table 2-2. Key Water Dates for the City of Brentwood 2010 UWMP Preparation and Submittal

	2011					
Action	**Feb**	**March**	**April**	**May**	**June**	**July**
Public Release of Draft UWMP				X		
2010 UWMP Pre-Adoption Hearing				X		
Public Release of Final Draft 2010 UWMP				X		
2010 UWMP Adoption Hearing				X		
Submit UWMP to DWR, California State Library, and City/County that Receives Water from Supplier					X	
Provide Copy of UWMP for Public Review					X	
Provide copies of UWMP to Supplied Entities					X	

RESOLUTION NO. 2011-75

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF BRENTWOOD ADOPTING THE 2010 URBAN WATER MANAGEMENT PLAN FOR SUBMITTAL TO THE DEPARTMENT OF WATER RESOURCES AS PREPARED BY CITY STAFF AND ICF JONES & STOKES INTERNATIONAL, ENGINEERING CONSULTANTS.

WHEREAS, on August 14, 2001, by Resolution No. 2341, the City Council adopted the 2000 Urban Water Management Plan (UWMP) as submitted by Brown and Caldwell, Environmental Engineers and Consultants; and

WHEREAS, on January 10, 2006, by Resolution No. 2006-6, City Council adopted the 2005 Urban Water Management Plan as submitted by Brown and Caldwell, Environmental Engineers and Consultants; and

WHEREAS, Urban Water Management Plans are prepared by California's urban water suppliers to support their long-term resource planning and ensure adequate water supplies are available to meet existing and future water demands; and

WHEREAS, every urban water supplier that either provides over 3,000 acre-feet of water annually or serves more than 3,000 connections is required to assess the reliability of its water sources over a 20-year planning horizon considering normal, dry, and multiple dry years; and

WHEREAS, this assessment is to be included in its UWMP, which is to be prepared every five years and submitted to the Department of Water Resources (DWR). The DWR then reviews the submitted plans to ensure the requirements identified in the Urban Water Management Planning Act (Division 6 Part 2.6 of the Water Code §10610 - 10656) are completed; and

WHEREAS, the City of Brentwood is an urban water supplier providing water for municipal purposes to more than 3,000 customers, and has prepared the 2010 UWMP, which provides the analysis of water conservation measures in accordance with the guidelines of the California Urban Water Conservation Council and DWR and it serves as the long-term water supply plan for the City of Brentwood water system, and supports the reduction of 20 percent per capita use by the year 2020; and

WHEREAS, the funds for the preparation of the 2010 UWMP were budgeted in the City Council adopted 2010/11 Operating Budget through the Water Operations Operating Budget; and

WHEREAS, City staff and ICF Jones & Stokes International, Engineering Consultants have prepared the 2010 UWMP, made it available for public review, and has held the appropriate public hearing.

NOW, THEREFORE BE IT RESOLVED by the City Council of the City of Brentwood that the 2010 UWMP is hereby adopted.

PASSED, APPROVED, AND ADOPTED by the City Council of the City of Brentwood at a regular meeting held on the 24h day of May 2011 by the following vote:

AYES:	Barr, Brockman, Bryant, Stonebarger, Taylor
NOES:	None
ABSENT:	None
ABSTAIN:	None

Robert Taylor
Mayor

ATTEST:

Margaret Wimberly, CMC
City Clerk

RESOLUTION NO. 2013-176

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF BRENTWOOD ADOPTING THE FINAL 2010 URBAN WATER MANAGEMENT PLAN AS RECOMMENDED BY THE CALIFORNIA DEPARTMENT OF WATER RESOURCES.

WHEREAS, on August 14, 2001, by Resolution No. 2341, the City Council adopted the 2000 Urban Water Management Plan as submitted by Brown and Caldwell, Environmental Engineers and Consultants; and

WHEREAS, on January 10, 2006, by Resolution No. 2006-6, City Council adopted the 2005 Urban Water Management Plan as submitted by Brown and Caldwell, Environmental Engineers and Consultants; and

WHEREAS, on May 24, 2011, by Resolution No. 2011-75, City Council adopted the 2010 Urban Water Management Plan as prepared by staff and ICF Jones & Stokes, International, Engineering Consultants; and

WHEREAS, Urban Water Management Plans ("UWMP") are prepared by California's urban water suppliers to support the long-term resource planning and ensure adequate water supplies are available to meet existing and future water demands; and

WHEREAS, every urban water supplier that either provides over 3,000 acre-feet of water annually or serves more than 3,000 connections is required to assess the reliability of its source water over a 20-year planning period considering normal, dry, and multiple dry years; and

WHEREAS, this assessment is to be included in its UWMP, which is to be prepared every five years and submitted to DWR for review to ensure the requirements identified in the Urban Water Management Planning Act (Division 6 Part 2.6 of the Water Code §10610 - 10656) are completed; and

WHEREAS, the City of Brentwood is an urban water supplier providing water for municipal purposes to more than 3,000 customers, and has prepared the 2010 UWMP, which provides the analysis of water conservation measures in accordance with the guidelines of the California Urban Water Conservation Council and DWR and it serves as the long-term water supply plan for the City of Brentwood, and supports the reduction of 20 percent per capita use by the year 2020; and

WHEREAS, the adopted 2010 UWMP was submitted to the DWR July 1, 2011; and

WHEREAS, the DWR has reviewed and commented on the 2010 UWMP; and

WHEREAS, City staff has prepared the Final 2010 UWMP, made it available for public review and has held the appropriate public hearing.

NOW, THEREFORE BE IT RESOLVED by the City Council of the City of Brentwood adopts the Final 2010 Urban Water Management Plan as recommended by the California Department of Water Resources.

PASSED, APPROVED AND ADOPTED by the City Council of the City of Brentwood at a regular meeting held on the 10th day of December 2013 by the following vote:

AYES:	Barr, Bryant, Clare, Stonebarger, Taylor
NOES:	None
ABSENT:	None
ABSTAIN:	None

Robert Taylor
Mayor

ATTEST:

Margaret Wimberly, MMC
City Clerk

Chapter 3
System Description

This chapter discusses the City's water system as well as its climate, population, and demographics. It also describes the physical system (transmission, treatment, and distribution facilities) to support Water Conservation Act of 2009 requirements. Changes to the water system, the water supplier's organizational structure, and issues that affect the water system are also discussed.

Service Area Physical Description

The City currently supplies water to approximately 16,000 water connections in a service area of 14.83 square miles (Contra Costa Local Area Formation Committee 2008). Brentwood is bounded to the north by the City of Oakley, to the west by the City of Antioch, and to the south and east by unincorporated Contra Costa County. The City's service area is shown in Figure 3-1.

All water deliveries are metered. The service area is primarily residential, with small areas of commercial, office, and light industrial land uses. The City provides water treatment and distribution services as well as wastewater collection, treatment, and treated waste disposal services for its residents and businesses. The City has no agriculture deliveries; deliveries to agricultural users are made by the East Contra Costa Irrigation District. The City land use plan includes numerous parks, large areas of agriculture conservation, and special planning areas that are undeveloped.

Environmental Setting

A description of the City's environmental setting follows and includes a discussion of land use, geography, climate, and hydrology.

Land Use

Settled in 1874, the area that would eventually become the City of Brentwood began as a farming community in the late 19th century and still is known throughout the Bay Area for its agricultural products, primarily its cherries, corn, and peaches. Since 1990, many of the old farms and orchards have been replaced by suburban developments. The predominant land use is now residential, with the majority of residential development being single family. The City currently has several small to mid-sized office buildings, as well as larger business park sites, that house financial, consulting, telecommunications, computer, and bio-tech companies.

Geography

The area extends from steep, hilly terrain in the southern and western portions of the service area to flat terrain with a gentle slope in the northeastern portion of the service area. Elevations range from approximately 30 feet to almost 500 feet.

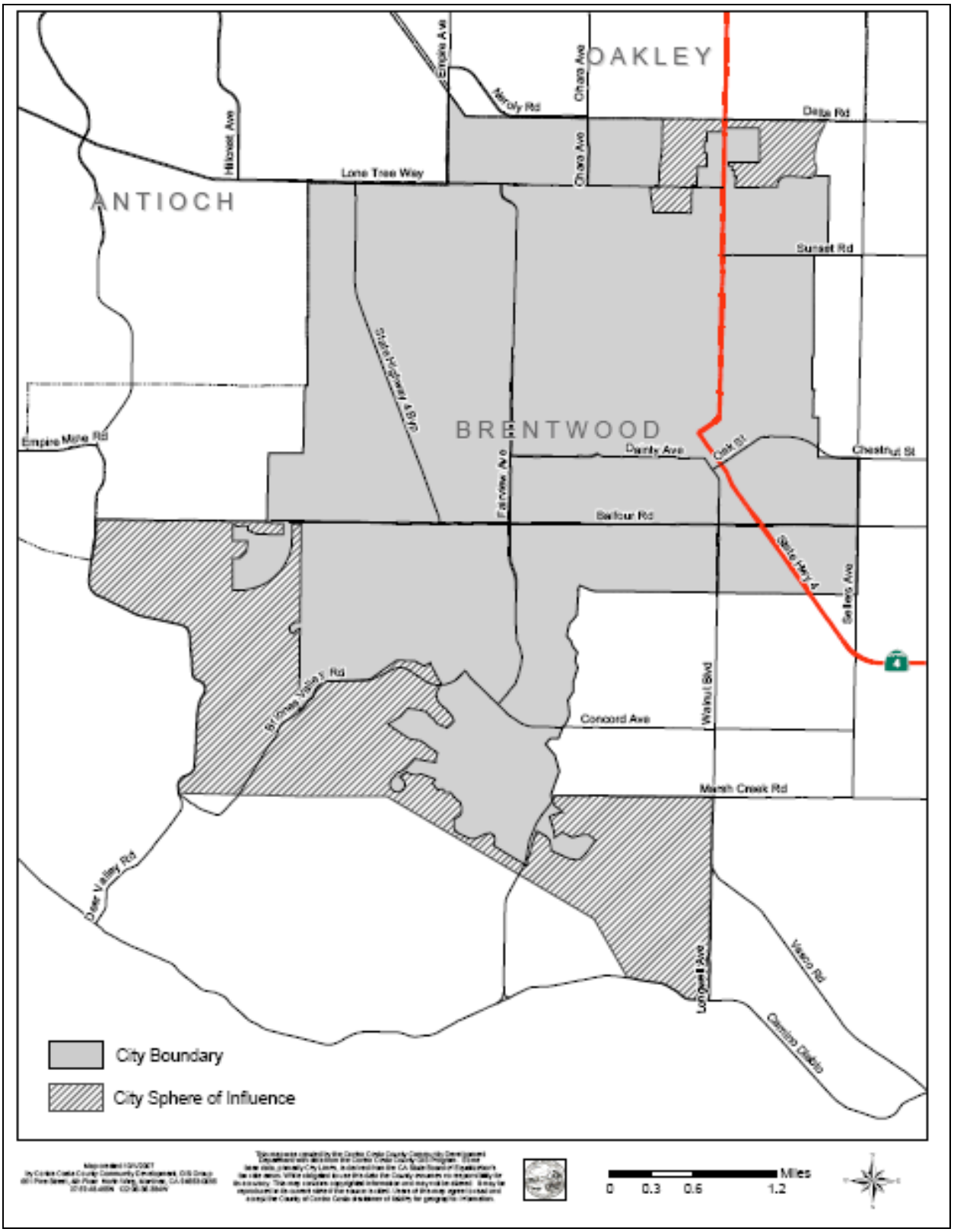

Figure 3-1. City of Brentwood Location Map
(Contra Costa County Community Development Department 2007)

Climate

The City's weather is similar to that of the City of Antioch because the two cities are adjacent, and a significantly longer data set was available for the City of Antioch than for the City of Brentwood. Therefore, the climate data for the City of Antioch was utilized in this report as it serves as a suitable climate reference to the City of Brentwood. In general, winters are cool and humid and summers are hot and dry. Historical climate data for the City of Antioch (1955–2010) obtained from the Western Regional Climate Center (WRCC) web site (Western Regional Climate Center 2011) were used to describe precipitation and temperature patterns.

The City of Antioch's average daily temperature ranges from 35 to 92 degrees Fahrenheit (°F), but the extreme low and high temperatures have been 18°F and 117°F, respectively. The historical (1961–1990) monthly average precipitation and minimum and maximum air temperatures are shown in Table 3-1, and the annual average is shown in Figure 3-2. The rainy season begins in November and ends in March. Average monthly precipitation during the winter months is about 2 to 3 inches, but records show that the monthly winter precipitation has been as high as 8 inches (February 1998) and as low as 0 inches. Water demands during the winter are relatively low. Low humidity usually occurs in the summer months, from May to September. The combination of hot and dry weather during the summer results in high water demand during these periods. Landscape irrigation, including lawn irrigation in the summer, significantly contributes to higher summer water demand.

Hydrology

Brentwood is located in eastern Contra Costa County, on the eastern perimeter of the San Francisco Bay Area metropolitan area. The City lies in the Marsh Creek watershed and is surrounded by the foothills of Mt. Diablo and the rich farmlands of the famous Sacramento-San Joaquin Delta, which drains to San Francisco Bay.

The Marsh Creek watershed drains the east side of Mt. Diablo. It covers about 128 square miles of rangeland, farmland, protected parkland, and urban land. The creek flows approximately 30 river miles from its headwaters in the Morgan Territory Preserve through Brentwood and Oakley to empty into the Delta at Big Break near the confluence of the Sacramento and San Joaquin Rivers. Several creeks that run through the City, such as Sand Creek, Deer Creek, and Dry Creek, are all tributaries of Marsh Creek.

Geology

The geologic setting of Contra Costa County is composed of surficial (Quaternary) deposits that overlie fault-bounded bedrock assemblages. East Contra Costa County has four groundwater regions. The City occupies the largest region, an area where groundwater occurs in material that was deposited by streams that originate in the Coast Ranges to the west. Aquifer materials capable of yielding quantities of water suitable for municipal and/or agricultural purposes extend to depths of 600 feet below the ground surface.

Water Distribution System

The City's distribution system consists of three pressure zones, one wastewater treatment plant (WWTP), one potable water treatment plant, nine active groundwater wells, six water reservoirs,

seven water booster pump stations, and 172 miles of water mains within the city limits (cite). Figure 3-3 shows the locations of these features within the water service area.

Table 3-1. Average Monthly Precipitation and Air Temperature in Antioch, CA, near Brentwood, CA (1961–1990)

Month	Average Precipitation (inches)	Average Minimum Temperature (°F)	Average Maximum Temperature (°F)
January	2.41	36.2	53.4
February	2.27	40.0	60.2
March	1.80	42.8	65.4
April	0.87	45.7	71.6
May	0.31	50.5	78.8
June	0.01	55.2	85.4
July	0.03	56.8	90.6
August	0.06	56.2	89.6
September	0.23	54.3	85.6
October	0.89	49.2	77.3
November	1.80	41.4	61.9
December	1.86	36.6	54.0
Annual	12.63	47.2	73.0
Source: Western Regional Climate Center 2011.			

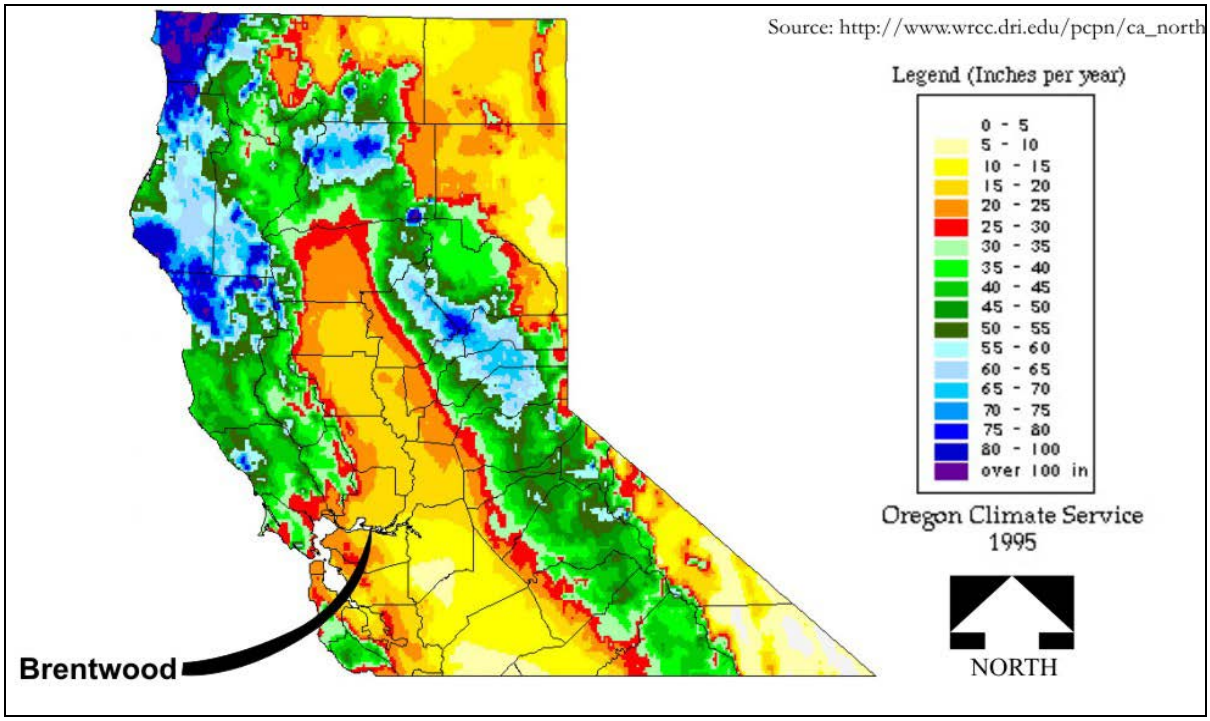

Figure 3-2. Northern California Annual Average Precipitation (in.), 1961

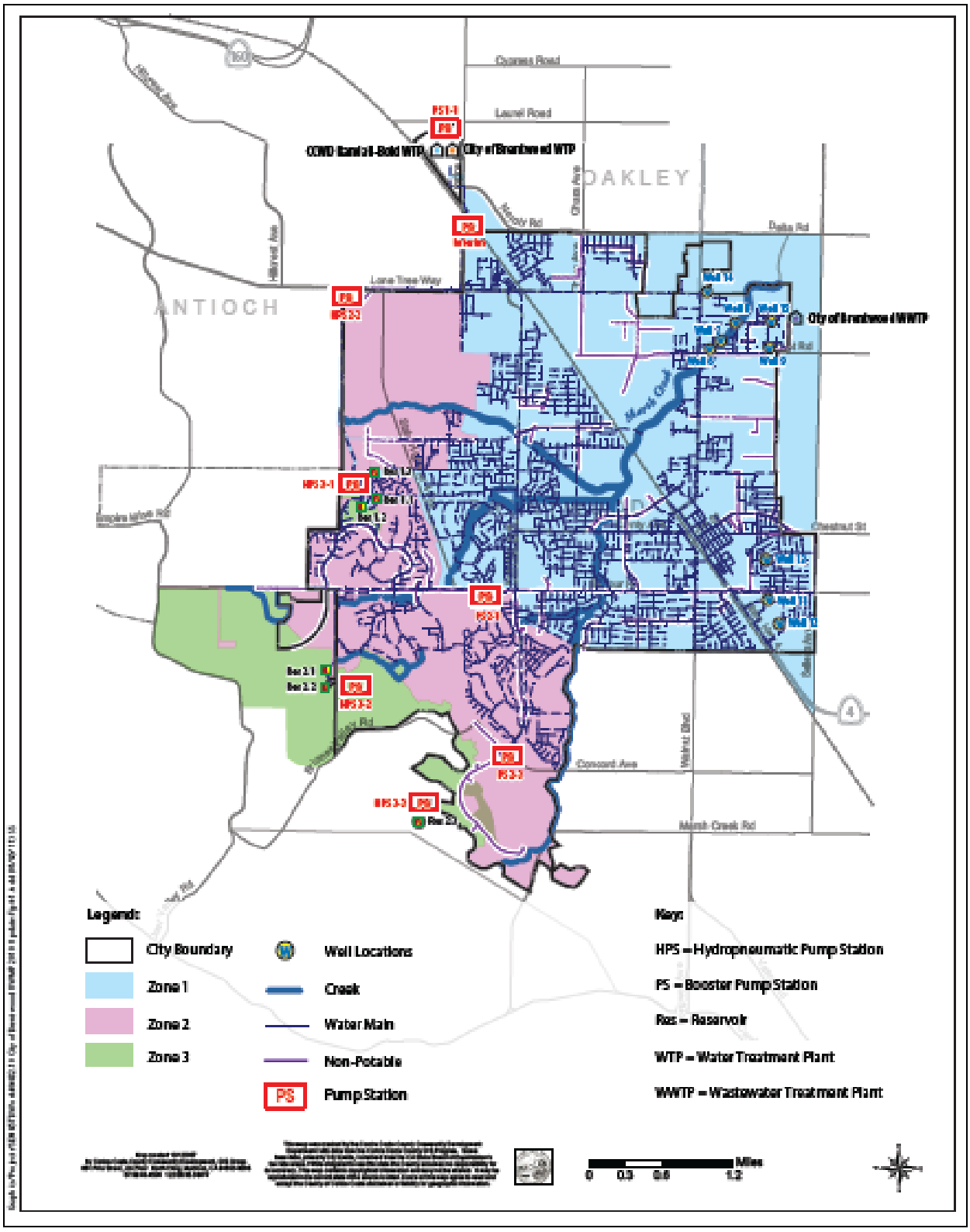

Figure 4-1
The City of Brentwood Water Service Area

Figure 3-3. The City of Brentwood Water Service Area

Pressure Zones

The City's distribution system consists of three primary pressure zones. Water pressure is maintained between 40 and 100 pounds per square inch. Pressure Zone 1 is both the largest and lowest (in elevation) zone and covers the east side of the City. The Zone 1 distribution system serves all developments with an elevation of less than 110 feet. All water supplied to the City goes through Zone 1 and is then pumped up to the other zones. Zone 1 has in-zone reservoir storage. Pressure Zone 2 is located primarily on the west and south side of the City at higher elevations. Zone 2 also has in-zone reservoir storage. Zone 2 is confined to areas with elevations greater than 110 feet but less than or equal to 220 feet. Pressure Zone 3 is composed of three isolated islands that operate as independent subzones to serve the higher elevations in the City. It is limited to areas with elevations greater than 220 feet but less than or equal to 330 feet. The three Zone 3 subzones are located generally in the northern, central, and southern parts of the west side of the City. All Zone 3 subzones are currently hydropneumatic zones, with no reservoir storage. In the future, the central subzone (Zone 3 Central) is expected to have in-zone reservoir storage. The north and south subzones (Zone 3 North and Zone 3 South) will remain hydropneumatic zones.

Treatment Facilities

The City receives water from three primary treatment plants: COBWTP, RBWTP, and the City WWTP. More information on these treatment facilities is provided in Chapter 5, System Supplies.

The COBWTP was built in 2008 to serve the City. It was part of a joint venture between the City and the Contra Costa Water District (CCWD) in which the City owns the facility and is responsible for operational and capital costs yet contracts with the CCWD for operation and maintenance of the facility. The first phase of the COBWTP, which has been constructed and is in operation, can treat up to 16.5 million gallons per day (mgd) of surface water. However, the plant is designed so that it can be expanded to an ultimate capacity of 30 mgd to serve the City's projected water demands through 2040.

The COBWTP treats raw water that the City purchases and diverts from Old River, Middle River, and Rock Slough, all of which have intakes connected by the CCWD's 48-mile Contra Costa Canal, which starts at Rock Slough and ends at the Martinez Reservoir (CCWD 2011). The COBWTP facilities are used for raw water pumping, flash mixing, flocculation, sedimentation, ozonation, filtration, and water storage. Treated surface water is pumped into the City's Zone 1 via a treated water pump station located at the COBWTP and a large diameter transmission pipeline.

The RBWTP is owned and operated by CCWD. The RBWTP treats Delta water that is blended in the Contra Costa Canal (Old River, Middle River, and Rock Slough), and Los Vaqueros Reservoir (City of Brentwood 2005, p. 2-4). Prior to operation of the COBWTP, the City received up to 14,800 acre-feet (4,823 million gallons) of water per year from the East Contra Costa Irrigation District (ECCID), which was withdrawn at Old River, Middle River, and Rock Slough and treated by the CCWD at the RBWTP to provide interim treatment for the City (as part of the City's 1999 agreement with the CCWD and the ECCID). This 14,800 acre-feet per year from Old River, Middle River, and Rock Slough is now treated by the COBWTP.

Located adjacent to one another, the COBWTP and the RBWTP share certain facilities and operational staff. These facilities are either independently owned by the CCWD or owned by the

RBWTP under a Joint Powers Agreement.[1] These facilities include solids lagoons (owned by the CCWD), a standby electrical power system (owned by the CCWD), and 21-kilovolt electrical service feeds (owned under the Joint Powers Agreement). The COBWTP has interim use of the RBWTP's service roads until a separate, independent access road on Empire Avenue can be constructed by the City. The communication and control systems of the two water treatment plants are connected. The plants share common control rooms and several buildings and can be interconnected to provide two-way backup during planned maintenance and emergencies.

Along with treatment and disposal, or reuse, of wastewater generated in the City, the City WWTP supplies recycled water via tertiary treatment for landscape irrigation and concrete batch production at the City's only industrial site. The City plans to expand its recycled water deliveries to several golf courses and parkways in the future.

Groundwater Wells

Seven out of nine permitted groundwater wells located within the City's water service area are active. Groundwater is treated at the wellhead prior to delivery to the drinking water distribution system. The City has two main well fields: Wells 6, 7, 8, 14, and 15, located in the northeast part of the City, and Wells 12 and 13 to the south. Of the two wells that are not in use, Well 9 currently does not have a disinfection system, and Well 11 is not used because of high nitrate concentrations. The wells are not typically drawn to capacity as the average annual production of all the active wells (2000-2010) is 4.13 mgd and the total well capacity is 6.50 mgd.

Table 3-2 summarizes the characteristics of the existing wells.

Table 3-2. Permitted Wells for the City of Brentwood

Well Number	Start-Up Year	Well Design Capacity (mgd)	Average Annual Production (2000–2010) (mgd)
6	1987	1.15	0.72
7	1987	1.01	0.74
8	1994	1.44	0.77
9	2000	NA	Not Currently Active
11	1995	NA	Not Currently Active
12	1997	0.58	0.27
13	1997	0.36	0.27
14	2001	1.44	1.09
15	2006	0.65	0.27
Total		**6.5**	**4.13**
Source: City of Brentwood 2006a and subsequent updates from the City.			

Reservoirs

The six existing reservoirs in the City have a combined capacity of 18.8 million gallons. Water is pumped through the reservoirs and used continually rather than for storage purposes. Therefore,

[1] The Joint Powers Agreement includes the cities of Antioch, Brentwood, and Oakley as well as Contra Costa County.

available reservoir water volumes fluctuate daily but are kept relatively consistent throughout the year. Therefore, it is assumed that the City has no annual net change in storage. These reservoirs provide equalization, emergency supply, and fire supply.

Table 3-3 lists the storage reservoirs and their capacities.

Table 3-3. Brentwood Reservoir Storage Tanks

Name	Type	Volume (MG)
Zone 1		
Reservoir No. 1.1	Gravity	2.5
Reservoir No. 1.2	Gravity	4.3
Reservoir No. 1.3	Gravity	4.0
Reservoir No. 1.4 - future	Pump	
Reservoir No. 1.5- future	Pump	
Zone 2		
Reservoir No. 2.1	Gravity	2.0
Reservoir No. 2.2	Gravity	2.0
Reservoir No. 2.3	Gravity	4.0
Reservoir No. 2.4- future	Gravity	
Zone 3		
Reservoir No. 3.1- future	Gravity	
Total Capacity		**18.8**
Source: City of Brentwood 2006a and subsequent updates from the City.		

Pump Stations

The City's pump stations provide a redundancy in the City's water system. Of the seven pump stations, one of them, the Roddy Ranch Pump Station, which is located on the ECCID canal, delivers raw water. The City's maximum pumping capacity is 53.8 mgd, which includes treated water from the pump station located adjacent to the COBWTP (City of Brentwood 2010c). This exceeds the highest level of demand. The City has two types of pump stations: booster and hydropneumatic. Booster pump stations are sized for maximum-day demand (average flow on the "maximum day") for the area they serve. Hydropneumatic pump stations must provide capacity to meet domestic peak-hour flows and typically include a standby pump, a large fire pump, and a standby fire pump. Hydropneumatic stations require backup power to ensure that the pumps will be operational at all times. Booster pump stations that pump into zones with reservoir storage do not need fire pumps or backup power.

Zone 1 is the largest zone and thus requires the most storage. All water supplied to the City goes through Zone 1 and is then pumped up to the other zones. Pump stations in Zone 1 pump stored water out of the non-gravity reservoirs and into the system. Zone 2 has in-zone reservoirs and pump stations that pump water to two of the three Zone 3 subzones (north and south) because they currently are hydropneumatic zones with no reservoir storage. Table 3-4 summarizes the design capacities of each pump station.

Table 3-4. Brentwood Booster Pump Stations

Name	Type	Purpose	Capacity (mgd)
Zone 1			
PS 1.1	Booster	Supplies treated surface water from the COBWTP	36
Zone 2			
PS 2.1	Booster	Zone 2 pumping capacity to refill Zone 2 reservoirs and pass water via Zone 3	3.6
PS 2.2	Hydropneumatic	Serves Zone 2	2.3
PS 2.3	Booster	Additional Zone 2 pumping capacity and refill capacity for Reservoir 2.3	3.9
Zone 3			
HPS 3.1	Hydropneumatic	North subzone	2.0
HPS 3.2	Hydropneumatic	Central subzone	2.0
HPS 3.3	Hydropneumatic	South subzone	4.0
Total Pump Capacity			**53.8**
Source: City of Brentwood 2006a and subsequent updates from the City.			

Piping System

The City's distribution system consists of pipelines of various sizes, all of which are adequately sized to meet build out demands. The City currently maintains 172 miles of distribution mains (City of Brentwood 2007a). The original water mains were constructed in 1940 and range in size from 4 to 10 inches in diameter. Larger-diameter water mains have been constructed more recently. A 42-inch-diameter transmission main transports treated water from the RBWTP along Empire Road to the inter-tie and pump station, and then smaller distribution lines connect to the system at Lone Tree Way.

Water is transported via the piping system from the Zone 1 reservoirs to the downtown system by a 24-inch-diameter water main west of Fairview Avenue, which connects to a 20-inch-diameter water main along Dainty Avenue. A 16-inch-diameter transmission main transports water from the northern wells southward along Highway 4 to the downtown pipe grid system. The City currently has an ongoing program to replace sections of the original water mains that are in need of repair.

Service Area Population

The City had a January 2010 of population of 51,394 (California Department of Finance 2011) in an area of approximately 15 square miles (Contra Costa Local Area Formation Committee 2008). According to DWR's methodology for estimating service area population (California Department of Water Resources 2011a), the City is considered to be a Category 1 water supplier because its actual distribution area overlaps substantially (≥ 95%) with the boundaries of the City during baseline and compliance years.

The City was incorporated in 1948 with a population of 1,700. The City's population has increased dramatically since 1990, when, according to U.S. census data, the population was approximately 7,500. In addition to the increase in population, demographics have changed as the area evolved from an agricultural community to a predominantly residential community. However, the

population boom of the late 1990s and early 2000s, a time when annual double-digit percentage increases were common, has tapered substantially.

The City underwent a dramatic economic boom from 2000 through 2008. However, economic growth stalled in 2009, paralleling changes in the U.S. economy and the real estate market collapse in California. As a result, the City experienced a one percent decrease in population from 2009 to 2010 (City of Brentwood, 2010a). The population growth rate, which is expected to remain below 1% until 2013, is expected to peak at 2% in 2016 before beginning to decline slightly, according to the City of Brentwood 2009/10 Fiscal Model (City of Brentwood 2010a). The City's population is projected to reach 69,826 by 2030, with an annual growth rate of 1.5% from 2010 through 2030 (City of Brentwood 2010a). At build out, the City is estimated to have a total population of approximately 76,226 citizens, which is expected to be reached sometime after 2050 (City of Brentwood 2010a). A total maximum-day build out water demand of 41 mgd of water must be supplied to the City from all sources (City of Brentwood 2006a, p. 1).

Historical and current population data for the City come from the California Department of Finance Demographic Research Unit (DRU) as control totals for each jurisdiction. Historical population estimates for evaluating historical growth are used in the City's annual fiscal model reports. Population projections are also estimated by using Department of Finance DRU data. The population projections are driven by economic and demographic mathematical models and constrained by examining local governments' plans, policies, and regulations that affect land development.

Population projections are used by the annual Fiscal Model developed by the City's Finance Department. The department uses the City's growth model, which is based on projected residential and commercial growth. Projections consider historical and present trends, taking into account available vacant land, redevelopment activities, and current land use policies and plans. Residential and commercial projections indicate that the worst of the development slowdown is over. The total number of new single family houses is planned to increase by at least 100 units per year, and the number of multi-family units is projected to be initially slow, but reach 50 units per year by 2013 (City of Brentwood 2010a). Commercial growth (in square feet), which has recently declined substantially, is forecast to remain sluggish for the next few years, followed by an increase in 2013. This pattern of little development followed by a return to modest growth is consistent with the residential development forecast (City of Brentwood 2010a).

A summary of the historic and projected population within the area served by the City water system is presented in 5-year increments in Table 3-5.

Table 3-5 (DWR Table 2). City of Brentwood Population (Current and Projected)

Table 2 City of Brentwood Population (Current and Projected)							
	2010	**2015**	**2020**	**2025**	**2030**	**2035 (optional)**	**Data Source**
Service area population[1]	51,394	55,159	60,290	66,561	69,826	72,696	City of Brentwood 2010a and City of Brentwood 2011a
[1] Service area population is defined as the population served by the distribution system.							

Other Demographic Factors Affecting Water Supply and Demand

Many people choose to reside in Brentwood because of the affordability of housing. Despite the growing population and increased employment rates in the City, almost 90% of Brentwood residents commute to jobs outside of the City, primarily to employment opportunities in San Francisco, Oakland, Concord, Walnut Creek, Antioch, and Pittsburg (City of Brentwood 2001).

Within the City, the largest employers are community-serving retail and government employers (e.g. school districts). Agriculture remains important to the local economy but has declined in relative importance as the City has become more suburban. There is no heavy industry and only a small light industry area in the northeastern part of the City. The Police Department is the fastest growing City Department. Police are the only department that is projected to hire additional staff over the next ten years (City of Brentwood 2010a).

Chapter 4
System Demands

Water Demands

This chapter presents an analysis of available water use data, customer connections, historical groundwater and surface water production, unit water use, and the resulting projections for future water needs for the City.

Baseline and Targets

The Water Conservation Act of 2009 states that an urban retail water supplier shall include baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use estimates in its UWMP, along with the basis for determining these estimates, including references to supporting data.

Baseline and Compliance Water Use Determination Methodologies

DWR has developed nine methodologies for determining baseline water use and associated compliance with the 2020 water use target (California Department of Water Resources 2011a). Water suppliers must define a 10- or 15-year base (or baseline) period for water use, which will be used to develop target levels of per capita water use. The longer baseline period applies to a water supplier that meets at least 10% of its 2008 measured retail water demand through recycled water. Water suppliers must also calculate water use for a 5-year baseline period and use that value to determine the minimum required reduction in water use by 2020. The City has chosen the 10-year baseline period because recycled water demand in 2008 was less than 10%. Baseline water use targets were determined using *Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use* (California Department of Water Resources 2011a). Table 4-1 summarizes the base-period ranges and indicates how they were determined.

Table 4-1 (DWR Table 13). Base-Period Ranges

Table 13 Base-Period Ranges			
Base	**Parameter**	**Value**	**Units**
10- to 15-year base period	2008 total water deliveries	4,595	million gallons
	2008 total volume of delivered recycled water[1]	25	million gallons
	2008 recycled water as a percent of total deliveries	0.57	percent
	Number of years in base period[2]	10	years
	Year-beginning base-period range	2001	
	Year-ending base-period range[3]	2010	
5-year base period	Number of years in base period	5	years
	Year-beginning base-period range	2005	
	Year-ending base-period range[3]	2009	

[1] Delivered recycled water for 2008 was calculated as the total produced recycled water (51 million gallons) minus what was used for wastewater treatment plant operations (28 million gallons).

[2] If the percentage of 2008 recycled water is less than 10%, then the first base period is a continuous 10-year period. If the amount of recycled water delivered in 2008 is 10% or greater, the first base period is a continuous 10- to 15-year period.

[3] The ending year must be between December 31, 2007, and December 31, 2010.

Table 4-2 summarizes the annual population, daily gross water use, and annual per capita water use totals during a 10-year period (2001–2010). These were used to determine the City's 2015 and 2020 water use targets. Gross water use was calculated using the methodology described in DWR's *Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use* (California Department of Water Resources 2011a).

Table 4-2 (DWR Table 14). Base Daily per Capita Water Use (10-year range)

Table 14 Base Daily per Capita Water Use (10-year range)				
Base-Period Year		Distribution System Population[1]	Daily System Gross Water Use (mgd)[2]	Annual Daily per Capita Water Use (GPCD)
Sequence Year	Calendar Year			
Year 1	2001	26,181	5.7	220
Year 2	2002	29,956	7.8	261
Year 3	2003	34,055	8.3	243
Year 4	2004	38,325	9.1	238
Year 5	2005	41,954	10.6[3]	253
Year 6	2006	45,752	10.6	231
Year 7	2007	48,667	12.0	246
Year 8	2008	50,618	12.0	238
Year 9	2009	51,908	11.2	216
Year 10	2010	51,394	10.5	203
Base Daily per Capita Water Use				**235**

GPCD = gallons per capita per day.
[1]Source: California Department of Finance 2010.
[2] Source: Gross water use calculated using Water Produced data compiled using Public Water Statistic Reports, Annual Report to the CDPH, and GPCD data provided by the City.
[3] A 6% increase in the total water produced volume was applied to the year 2005 to eliminate discrepancies between water produced and water delivered. Discrepancies are likely attributed to errors in the data record that occurred during the transition process when improvements were made in data collection and billing practices in 2005.

The City's 2020 water use target was calculated as 80% of the 10-year baseline water use, and the 2015 water use target was calculated as 90% of the 10-year baseline water use. Table 4-3 summarizes these water use and target GPCD values.

Table 4-3. Summary of 10-year Baseline Water Use and Target GPCD Values

10-year Baseline GPCD	235
2015 10-year Baseline Interim Target GPCD	211
2020 10-year Baseline Target GPCD	188
GPCD = gallons per capita per day.	

Table 4-4 summarizes the population, daily gross water use, and annual daily per capita water use totals during a 5-year period (2004–2009). These were used to determine the City's minimum water use reduction requirement.

Table 4-4 (DWR Table 15). Base Daily per Capita Water Use (5-year range)

Table 15 Base Daily per Capita Water Use (5-year range)				
Base-Period Year		Distribution System Population[1]	Daily System Gross Water Use (mgd)[2]	Annual Daily per Capita Water Use (GPCD)
Sequence Year	Calendar Year			
Year 1	2005	41,954	10.6	253
Year 2	2006	45,752	10.6	231
Year 3	2007	48,667	12.0	246
Year 4	2008	50,618	12.0	238
Year 5	2009	51,908	11.2	216
Base Daily per Capita Water Use				**237**

GPCD = gallons per capita per day.
[1]Source: California Department of Finance 2010.
[2] Source: Gross water use calculated using Water Produced data compiled using Public Water Statistic Reports, Annual Report to the CDPH, and GPCD data provided by the City.

The City's 2020 minimum water use reduction target was calculated as 80% of the 5-year baseline water use, and the 2015 minimum water use reduction target was calculated as 90% of the 5-year baseline water use. Table 4-5 summarizes these water use and target GPCD values.

Table 4-5. Summary of 5-year Baseline GPCD and Targets

5-year Minimum Baseline GPCD	237
2015 Minimum Baseline Interim Target GPCD	213
2020 Minimum Target GPCD	189
GPCD = gallons per capita per day.	

Water Demand by Water Use Sector

Table 4-6 describes past and current water deliveries, the number of units (per 1,000 gallons), and the number of metered connections by water sector. Several assumptions were used in calculating actual water use and water use projections. The industrial and institutional/government water sector volumes are blank in the DWR tables because the City includes them in the commercial water sector when tracking and reporting. Unlike water production data, water delivery data includes recycled water and does not include meter adjustments. The City provides water treatment and distribution services as well as wastewater collection, treatment, and treated water disposal services to the following water sectors:

- **Single-Family Residential**—This sector refers to single-family residences in an identifiable suburban residential neighborhood or cluster-style development designed with open space and other amenities (City of Brentwood 2001).
- **Multi-Family Residential**—This sector refers to families living in apartments and condominiums in structures of two or three stories with off-street parking and other requirements for higher density living (City of Brentwood 2001).

- **Commercial/Institutional**—This sector includes commercial, government (city accounts), and industrial uses. It includes primarily uses associated with commercial buildings (e.g., landscaping; toilets; heating, ventilation, and air conditioning; etc.) and commercial uses (e.g., car washes, laundries, nurseries, etc.). This sector includes recycled water provided to a concrete batch plant.
- **Landscape**—This sector includes primarily raw water use for irrigation at parks, schools, cemeteries, churches, residences, or public facilities (including city accounts). This sector includes recycled water at various parkways and landscaped medians throughout the City.
- **Other**— This sector includes metered water and unmetered water. Metered water includes hydrant meter water use from which meters are read quarterly. The unmetered water volume includes water use from activities such as firefighting, construction, street sweeping, system flushing, and meter discrepancies. This also includes system losses and other unaccounted-for water use. This sector includes a water volume that accounts for the difference in water production and delivery data.

Historical Water Deliveries

Records of historical water deliveries were obtained from the City's annual reports sent to DWR and California Department of Public Health (CDPH). The records serve as the basis for developing unit water demands and peaking ratios for the City's system. These data are reported as water delivered, but the total volume was estimated to equal total annual water production volume by adding the remaining unaccounted-for water into the "other" category. Water production is the volume of water measured at the source, which includes all water delivered to residential, commercial/industrial, and institutional/government connections as well as unaccounted-for water.

2005 Water Deliveries

Recycled water began to be produced and distributed by the City WWTP in 2005. However, recycled water is not included in historical water deliveries because it is considered to be water reuse as opposed to water production. Table 4-6 shows 2005 water deliveries per water sector, as well as the annual GPCD.

Table 4-6 (DWR Table 3). Water Deliveries (actual), 2005

Table 3 Water Deliveries (actual), 2005[1]						
	2005					
	Metered		Not Metered			
Water Use Sectors	No. of Accounts	Volume	No. of Accounts	Volume	Total Volume	
		mgy		mgy	mgd	mgy
Single-Family Residential	13,731	2,762			7.6	2,762
Multi-Family Residential	39	76			0.2	76
Commercial[2,3]	561	821			2.2	821
Industrial	0	0			0	0
Institutional/government	0	0			0	0
Landscape[3]	190	174			0.5	174
Agriculture	0	0			0	0
Other	36	36		12	0.13	48
Total	**14,521**	**3,869**	**0**	**12**	**10.6**	**3,881**
				GPCD	**253**	

Units: million gallons per day (mgd); million gallons per year (mgy); gallon per capita per day (GPCD).
[1] Source: Gross water use calculated using Water Produced data compiled using Public Water Statistic Reports, Annual Report to the CDPH, and GPCD data provided by the City.
[2] Commercial and Industrial data are combined.
[3] Recycled water is included.

2010 Water Deliveries

According to 2010 water delivery data for the City, the single-family residential sector has the highest demand for water (65%). Landscape water use has the second highest demand for water (27%). The multi-family residential and commercial water sectors have the lowest total water volume demand (3% to 5%). Figure 4-1 shows water demand by water use sector.

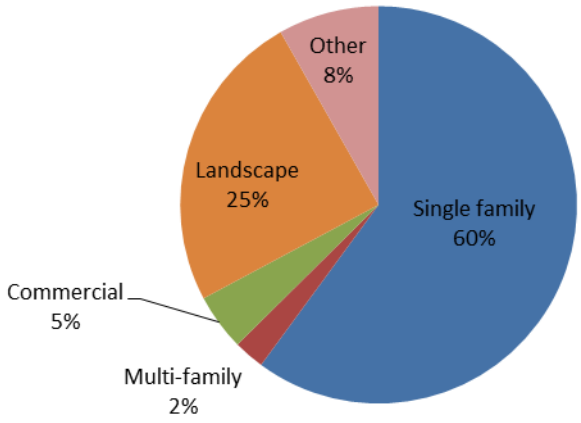

Figure 4-1. 2010 City of Brentwood Water Demand by Water Use Sector

Table 4-7 summarizes water delivery volumes by water sector. Compared with 2005 water deliveries, single-family residential and commercial water use decreased dramatically, whereas landscape water use increased. Single-family residential and commercial water use reductions are attributed primarily to the City's water conservation program efforts as well as the downturn in the economy. Increases in the landscape sector are attributed primarily to increases in the number of landscaped areas, such as golf courses and parkways.

As shown in Table 4-2, annual per capita water delivery use in 2010 was significantly less than the 2005 annual per capita water delivery use. This is likely most attributed to the City's conservation efforts. The reduction may also be due to the difference in total volumes of unaccounted-for water losses.

Table 4-7 (DWR Table 4). Water Deliveries (actual), 2010

Table 4 Water Deliveries (actual), 2010[1]						
Water Use Sectors	2010					
	Metered		Not Metered		Total Volume	
	No. of Accounts	Volume	No. of Accounts	Volume		
		mgy		mgy	mgd	mgy
Single-Family Residential	14,913	2,294			6.3	2,294
Multi-Family Residential	56	96			0.3	96
Commercial[2,3]	492	176			0.5	176
Industrial						
Institutional/government						
Landscape[3]	503	938			2.6	938
Agriculture						
Other	36	16		297	0.9	314
Total	**16,000**	**3,520**		**297**	**10.6**	**3,817**
				GPCD	**203**	

Units: million gallons per day (mgd); million gallons per year (mgy); gallon per capita per day (GPCD)..
[1] Source: Gross water use calculated using Water Produced data compiled using Public Water Statistic Reports, Annual Report to the CDPH, and GPCD data provided by the City.[2] Commercial and Industrial data are combined.
[3] Recycled water is included.

Changes in water deliveries from 2005 to 2010 vary depending on the sector. Single family water use volumes decrease, which this is primarily because of the economic downturn that occurred between 2005 and 2010, whereas landscape irrigation water use volumes increase, which is primarily due to increases in golf courses and parks within the City. Figure 4-2 shows changes in annual water deliveries per sector from 2005 to 2010.

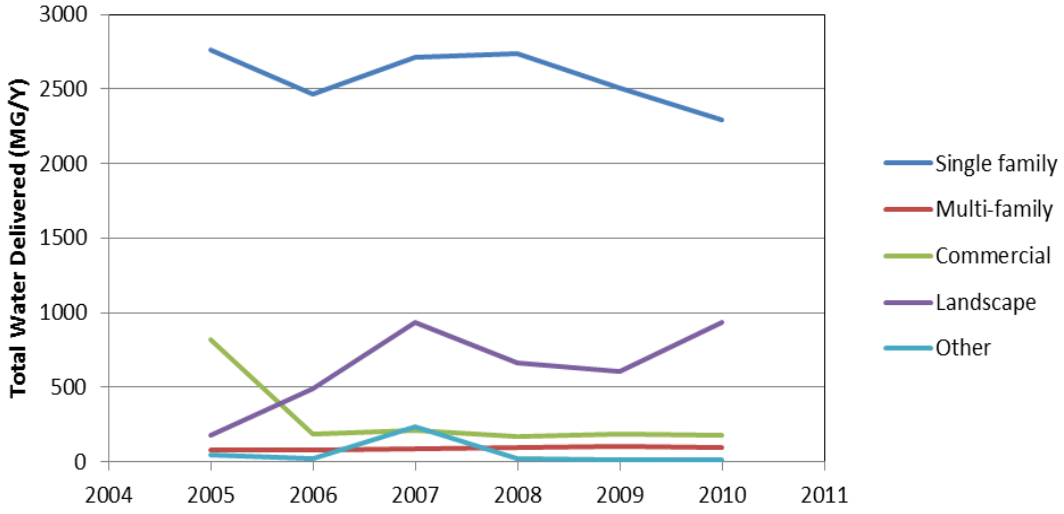

Figure 4-2. Changes in Annual City Water Deliveries per Sector from 2005 to 2010

Maximum-Day Demand

Water use varies continuously throughout a given day as well as seasonally. Daily demand fluctuates throughout the year based primarily on seasonal climate changes. Water use during a typical summer day is approximately four times that of a winter day. Maximum demands for water normally occur in June, July, August, and September. Increased landscape irrigation during the hot, dry weather is largely responsible for these higher demands. System production facilities must be sized to meet the demand on the maximum day of the year, not just the average. The ratio between average and maximum-day demands provides a maximum-day peaking factor that can be used to scale future demand projections to maximum-day levels. The City uses a maximum-day peaking factor of 2.1 (City of Brentwood 2006a).

Maximum daily water demand projections provide the basis for sizing and staging future water facilities. The City's preliminary design report for the COBWTP (2005) includes the City's 2001 master plan water demand projections, which will aid in determining when COBWTP capacity will need to be expanded to 30 mgd. The City has projected total annual water demand up to 2040 based on a maximum build out water demand of 41 mgd, with water supplied from all sources of supply (surface and groundwater).

Two maximum daily water demand growth-rate projection scenarios were evaluated: (1) a high growth rate curve and (2) a straight-line growth rate. The high growth rate curve provides a scenario in which water demands are high until 2020 and then slow from 2020 to 2040. This is consistent with the *Brentwood Treatment Options Study* (City of Brentwood 2003). Under the straight-line growth rate scenario, water demands are expected to increase at a constant rate until 2040. Actual water demands are expected to be between these two projections. Table 4-8 summarizes the projected maximum daily demands used to determine COBWTP expansion. According to the projections, the capacity of the COBWTP will be expanded between 2012 and 2018 (City of Brentwood 2005). In this UWMP, we assume this expansion will occur by 2020.

Table 4-8. Current and Projected Maximum Daily Water Demands (2005–2040) for the City of Brentwood

Year	Total Maximum Daily Demand—High Growth Rate Scenario (mgd)	Total Maximum Daily Demand—Straight-Line Growth Rate Scenario (mgd)	Well Supply (mgd)	RBWTP and COBWTP (mgd)
2005	17	15	5	6
2010	23	18.5	5	10–12
2015	29	22	5	13.5–18
2020	35	26	5	17–24
2025	36.5	30	5	21–24
2030	38	33.5	5	28.5–31.5
2035	39.5	37	5	32–34.5
2040	41	41	5	36
Source: City of Brentwood 2005.				

Water Demand Projections

The following tables define the projected reductions in water deliveries from 2015 through 2035. The percent increase in population for each year was used to project total water use per sector (see Table 3-5 for population projections).

For 2015 sector water use, there is an approximate 7% projected increase in population from 2010 to 2015. This 7% was applied to the number of metered accounts for each sector from 2010. As a result of this increase in population, the projected 2015 total water delivery volume and GPCD are greater than those of 2010. Using the baseline data and the methodologies described in previous chapters, the City is already meeting the required 2015 water use target (with 10-year base period) of 211 GPCD.

Table 4-9 summarizes total project water delivery volumes for 2015.

Table 4-9 (DWR Table 5). Water Deliveries (projected), 2015

Table 5 Water Deliveries (projected), 2015					
	2015				
	Metered		Not Metered		Total Volume
Water Use Sectors	No. of Accounts	Volume	No. of Accounts	Volume	
Single-Family Residential	16,856	2,456			2,456
Multi-Family Residential	57	102			102
Commercial	527	188			188
Industrial					0
Institutional/government					0
Landscape	539	1,004			1,004
Agriculture					0
Other	39	17		418[1]	436
Total	**18,016**	**3,768**		**418**	**4,186**
				GPCD	**208**

Units: Volume in million gallons per year; gallon per capita per day (GPCD).
[1] Projected "Non Metered Other" (or unaccounted-for) water use is calculated as the average of the differences between water production and water delivery volumes for a 10-year period (2001-2010). More information is provided in the section, *Unaccounted-for water use*.

For 2020 sector water use, there is an approximate 9% projected increase in population from 2015 to 2020. This 9% was applied to the number of metered accounts for each sector from 2015. Water deliveries from 2015 to 2020 will require reduction measures to meet a 20% overall reduction by 2020. The greatest water use reductions will come from the conversion of raw or potable water to recycled water for landscape watering. The projected landscape water use per account was reduced by 18% between 2015 and 2020. Water reductions could also come from the conversion of fire hydrant water lines to recycled water lines, which are covered under the "other" water use sector. The projected "other" water use per account was reduced by 15% between 2015 and 2020. Incremental water use reductions will occur within the multi-family and commercial water use sectors through increased use of water-efficient practices and technologies. Single-family use was

reduced by 5% between 2015 and 2020. It was already dramatically reduced between 2005 and 2010 for 2010 projections.

Table 4-10 (DWR Table 6). Water Deliveries (projected), 2020

Table 6 Water Deliveries (projected), 2020					
	2020				
	Metered		Not Metered		Total Volume
Water Use Sectors	No. of Accounts	Volume	No. of Accounts	Volume	
Single-Family Residential	18,354	2,540			2,540
Multi-Family Residential	62	106			106
Commercial	574	195			195
Industrial					
Institutional/government					
Landscape	586	897			897
Agriculture					
Other	42	16		376[1]	393
Total	**19,618**	**3,754**			**4,130**
				GPCD	**188**

Units: Volume in million gallons per year; gallon per capita per day (GPCD).
[1] Projected "Non Metered Other" (or unaccounted-for) water use is calculated as 10% of the average of the differences between water production and water delivery volumes for a 10-year period (2001-2010). The 10% reduction represents decreases in unaccounted-for water use volumes due to the City improvements. More information is provided in the section, *Unaccounted-for water use*.

Table 4-11 summarizes total project water delivery volumes for 2025, 2030, and 2035. For 2025 sector water use, there is an approximate 10% projected increase in population from 2020 to 2025. This 10% was applied to the number of metered accounts for each sector from 2020. Although overall water volumes per sector do not decrease greatly, because of the increase in population, water deliveries from 2020 to 2025 will require reduction measures to maintain the 2020 water use target. The increase in population between 2025 and 2030 is projected to be approximately 5%; between 2030 and 2035, it is projected to be approximately 4%. Population projections decrease in 2030 and 2035. Water delivery reductions will be greatest in the landscape sector (due to the increased use of recycled water) to maintain the 2020 water use target through 2030 and 2035. Some reductions in the "other" water use sector will need to be made as well to maintain the 2020 water use target in 2035. Incremental reductions in the single-family, multi-family, and commercial water use sectors through water conservation measures will also be made to maintain the 2020 water use target in 2030 and 2035. Annual GPCD projections for 2025, 2030, and 2035 are 185, 185, and 186, respectively. All of these GPCDs will meet the 2020 Water Use Target of 188 GPCD.

Table 4-11 (DWR Table 7). Water Deliveries (projected), 2025, 2030, and 2035

Table 7a Water Deliveries (projected), 2025					
	2025				
	Metered		Not Metered		Total Volume
Water Use Sectors	No. of Accounts	Volume	No. of Accounts	Volume	
Single-Family Residential	20,168	2,791			2,791
Multi-Family Residential	68	116			116
Commercial	630	214			214
Industrial					
Institutional/government					
Landscape	644	985			985
Agriculture					
Other	46	18		376	394
Total	**21,557**	**4,125**		**376**	**4,501**
				GPCD	**185**

Units: Volume in million gallons per year; gallon per capita per day (GPCD).
[1] Projected "Non Metered Other" (or unaccounted-for) water use is calculated as 10% of the average of the differences between water production and water delivery volumes for a 10-year period (2001-2010). The 10% reduction represents decreases in unaccounted-for water use volumes due to the City improvements. More information is provided in the section, *Unaccounted-for water use*.

Table 7b Water Deliveries (projected), 2030					
	2030				
	Metered		Not Metered		Total Volume
Water Use Sectors	No. of Accounts	Volume	No. of Accounts	Volume	
Single-Family Residential	22,163	3,006			3,006
Multi-Family Residential	75	125			125
Commercial	693	231			231
Industrial					
Institutional/government					
Landscape	708	964			964
Agriculture					
Other	51	19		376	395
Total	**23,689**	**4,345**			**4,721**
				GPCD	**185**

Units: Volume in million gallons per year; gallon per capita per day (GPCD).
[1] Projected "Non Metered Other" (or unaccounted-for) water use is calculated as 10% of the average of the differences between water production and water delivery volumes for a 10-year period (2001-2010). The 10% reduction represents decreases in unaccounted-for water use volumes due to the City improvements. More information is provided in the section, *Unaccounted-for water use*.

Table 7c Water Deliveries (projected), 2035					
	2035				
	Metered		Not Metered		Total Volume
Water Use Sectors	No. of Accounts	Volume	No. of Accounts	Volume	
Single-Family Residential	24,354	3,204			3,204
Multi-Family Residential	82	134			134
Commercial	761	246			246
Industrial					
Institutional/government					
Landscape	778	953			953
Agriculture					
Other	56	19		376	395
Total	**26,031**	**4,556**			**4,932**
				GPCD	**186**

Units: Volume in million gallons per year; gallon per capita per day (GPCD).
[1] Projected "Non Metered Other" (or unaccounted-for) water use is calculated as 10% of the average of the differences between water production and water delivery volumes for a 10-year period (2001-2010). The 10% reduction represents decreases in unaccounted-for water use volumes due to the City improvements. More information is provided in the section, *Unaccounted-for water use*.

Low-Income Residential Water Use

The City has also projected water use for single-family and multi-family residential housing of lower income households. Low-income water use projections are based on the assumption that low-income residents are 10% of the single-family residents and 20% of the multi-family residents. Low-income units include 20 single-family dwelling units within the California Orchard subdivision, which was constructed during 2001 and 2002. These units have recorded affordability controls for 30 years. It also includes 30 low-income dwelling units that were constructed in 2007. Very low-income units include a two-unit duplex constructed by Habitat for Humanity in 2000. This development has a 30-year affordability agreement that expires in 2049. Additional very low-income units include 20 single-family units within the Arroyo Seco Estates subdivision, which includes 30-year resale restrictions that expire in 2029. The very low-income sector also includes 282 very low-income dwelling units and 54 low-income units (City of Brentwood 2001, p. 2-11).

Table 4-12 (DWR Table 8). Low-Income Projected Water Demands

Table 8 Low-Income Projected Water Demands					
Low-Income Water Demands[1]	2015	2020	2025	2030	2035 (optional)
Single-Family Residential	246	254	279	301	320
Multi-Family Residential	20	21	23	25	27
Total	**266**	**275**	**302**	**326**	**347**

Units: million gallons per year.
[1]Low-income water use is assumed to be 10% of single-family residential water use and 20% of multi-family residential water use.

Sales to Other Water Agencies

The City does not have any sales accounts with other water agencies. Therefore, projections on water sales to other water agencies were not determined.

Unaccounted-for Water Use

Unaccounted-for water use is unmetered water use, including water used for fire protection and training, system and street flushing, sewer cleaning, system leaks, system losses, and unauthorized connections. Unaccounted-for water can also result from meter inaccuracies and discrepancies in water use tracking systems. To account for these uses, unaccounted-for water use is included in the "Non metered" section of the "Other" category in the calculation of gross water use. For this UWMP, unaccounted-for losses are calculated as the differences between water production and water delivery volumes. Table 4-13 shows unaccounted-for water use only for historical years.

Table 4-13. Calculated Unaccounted-for Historical Water Use

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Water Produced	2,098	2,849	3,020	3,335	3,881	3,854	4,364	4,395	4,090	3,817
Water Delivered	1,749	2,302	2,520	3,046	3,869	3,238	4,174	3,689	3,413	3,520
Non Metered Other Sector Water	349	546	500	289	12	616	190	705	677	297
Units: million gallons per year (mgy).										

An unaccounted-for water use volume is included in water use projections as an average of unaccounted-for water use volumes from 2001-2010. The average of this 10-year period, 418 million gallons per year, was added to each projection to account for potential unaccounted-for losses. This additional volume results in conservative projections due to the assumption that unaccounted-for water use volumes are assumed to remain relatively unchanged from the average in the future. However, in order to meet the 2020 target of 188 GPCD, unaccounted-for water use volumes will need to be reduced by 10% to reach 375 million gallons per year by 2020. The City is currently, and plans to continue, implementing several measures to reduce unaccounted-for water use volumes and meet their reduction targets by year 2020 and beyond. These reduction measures include:

- Pipe infrastructure repairs where needed to prevent system leaks (physical losses due to leakage from pipes).
- Increased inspections and research to identify unauthorized connections.
- Replacing old meters with new ones to reduce the potential for meter inaccuracies.
- Installing new meters to improve tracking of water used for fire protection and training, system and street flushing, and sewer cleaning that are typically not metered.

Beyond the year 2020, unaccounted-for water use reductions are not necessary in order for the City to meet its reduction obligations beyond year 2020. However, in efforts to conserve and be stewards of the local water supply, the City will continue to identify and implement reduction measures to address unaccounted-for water consumption. This continued focus will ultimately improve the City's overall water supply efficiency and help them to meet their targeted reductions in the years following 2020.

Additional Water Uses and Losses

Additional water uses and losses include both recycled water use and unaccounted-for water losses. Historical recycled water use began in 2005, as shown in Table 4-14.

Table 4-14. Calculated Recycled Water Deliveries

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Industrial							0.86	1.69	2.52	1.12
Landscape					39.40	26.90	7.14	23.31	20.38	17.18
Total Delivered					39	27	8	25	23	18
Units: million gallons per year (mgy).										

Projected recycled water use was calculated for all the landscape, commercial (includes industrial) and "Other" water use sectors since these are the areas where recycled water use can be applied due to existing and planned recycled water pipe infrastructure. Projected recycled water use was calculated per sector based on the projected increase in water delivery accounts due to population projections and the water use volume per account from previous year. There is some unmetered recycled water use for landscaping and other purposes at the City WWTP that is not accounted for in these projections. System losses are accounted for in the unaccounted-for water use volumes described above. The City has no saline barriers, groundwater recharge, or conjunctive use operations. Therefore, water uses and losses were not projected for those sectors. Historical unaccounted-for water losses are shown in Table 4-13. Projected unaccounted-for water losses are based on an average of unaccounted-for water use volumes from 2001-2010. Projections for years 2020 and beyond include a 10% reduction from the 10-year average.

Additionalwater uses and losses are shown in Table 4-15.

Table 4-15 (DWR Table 10). Additional Water Uses and Losses

Table 10 Additional Water Uses and Losses							
Water Use[1]	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035 (optional)**
Saline Barriers							
Groundwater Recharge							
Conjunctive Use							
Raw Water							
Metered Recycled Water	39	18	18	45	133	224	311
System Losses[2]	12	297	418	376	376	376	376
Total	**51**	**315**	**436**	**421**	**509**	**600**	**687**

Units: million gallons per year.
[1]Any water accounted for in DWR Tables 3 through 7 is not included in this table.
[2]System losses are unaccounted-for water use volumes.

Total Water Use

Historical and projected total water demands are shown in Table 4-16 . Between 2005 and 2035, total water demands are expected to increase by 22%, from 3,932 million gallons in 2005 to 5,619 million gallons in 2035, with a projected 54% increase in population.

Table 4-16 (DWR Table 11). Total Water Use

Table 11 Total Water Use							
Water Use	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035 (optional)**
Total Water Deliveries (from DWR Tables 3 to 7)	3,881	3,817	4,186	4,130	4,501	4,721	4,932
Sales to Other Water Agencies (from DWR Table 9)	0	0	0	0	0	0	0
Additional Water Uses and Losses (from DWR Table 10)[1]	51	315	436	421	509	600	687
Total	**3,932**	**4,132**	**4,623**	**4,551**	**5,010**	**5,321**	**5,619**
Units: million gallons per year. [1] Additional Water Uses include system losses and recycled water volumes, as shown in DWR Table 10.							

Water Use Reduction Plan

The City is not an urban wholesale water supplier. Therefore, it does not need to include an assessment of present and proposed future measures, programs, and policies to help achieve wholesale water use reductions. See Chapter 8 for information on related items for the City as a retail water supplier.

Chapter 5
System Supplies

Water Sources

This chapter describes the sources of water available to the City for distribution and services. It includes a description of each water source, source limitations, water quality, and other water opportunities.

The City's current supply consists of both surface water from the Delta and groundwater from existing groundwater wells located in the San Joaquin Groundwater Basin. There are five sources of water supply for the City:

- **RBWTP:** Treated surface water purchased from Contra Costa Water District diverted from Old River, Middle River and Rock Slough delivered via the Contra Costa Canal.
- **Raw water:** Surface water purchased from ECCID delivered via the East Contra Costa Irrigation Canal.
- **Groundwater:** Groundwater from 7 active groundwater wells within the City.
- **COBWTP:** Supplier-produced surface water originally from diverted water from the Old River, Middle River and Rock Slough delivered by ECCID via the Contra Costa Canal.
- **Recycled Water:** Tertiary treated wastewater from the City's wastewater treatment plant (BWWTP**).**

Figure 5-1 depicts the water supply percentages based on 2010 water production volumes.

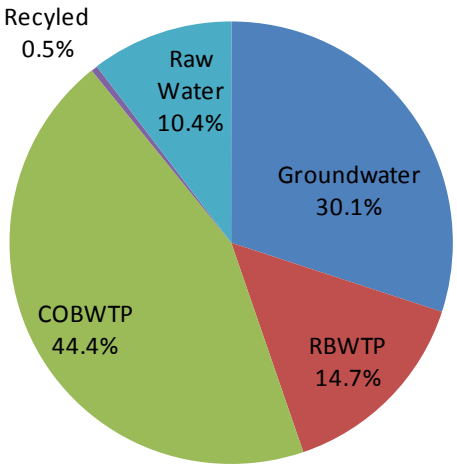

Figure 5-1. 2010 City of Brentwood Water Supply Allocations

With respect to potable water sources only, the City obtains approximately 58% of its water supply from treated surface water (COBWTP and RBWTP) and approximately 30% from groundwater wells. City water customers receive a blend of surface and groundwater from these sources. Of raw

water sources, approximately 0.5% is recycled water from the City WWTP and approximately 10% is raw water.

The City's current and projected water supply uses are summarized in Table 5-1. These values represent the actual and projected use (or purchases) based on percentages of total water deliveries (not water production volumes as shown in Figure 5-1). The rationale and assumptions used in determining current and projected water supplies is as follows:

- **East Contra Costa Water District (ECCID):** This water comes from the City's entitlement to purchase up to 14,800 acre-feet per year (4,823 million gallons per year) from ECCID, according to a 1999 agreement between ECCID and the City (Contra Costa Local Area Formation Committee 2007, pg. 3-7). The water is currently used for drinking water treatment at CCWD's RBWTP and the COBWTP. This allotment of 14,800 acre-feet per year will be maintained throughout the future, and therefore the volume does not change with projections.
    - **Contra Costa Water District (RBWTP):** The City has purchased a permanent capacity right of 6 mgd at the RBWTP and may use additional capacity on an as-need basis (Contra Costa Local Area Formation Committee 2007, p. 3-9). This volume is included in the 14,800 acre-feet per year allotted by ECCID.
    - **Supplier-Produced Surface Water (COBWTP):** The current capacity of the COBWTP is 16.5 mgd. Plant expansion to 30 mgd is expected to occur according to demand; capacity is projected to be reached by 2025. Projected use of COBWTP was calculated based on 48% of the City's total projected water deliveries. The percentage was calculated from the actual use percentage of total water deliveries in 2010. All of this water will be covered under the 14,800 allotted by ECCID.
- **ECCID Raw Water:** Raw water is delivered via the Roddy Ranch Pump Station on the ECCID Canal that supplies water to the City's raw distribution system. Projected use of raw water was calculated based on 11% of the City of total projected water deliveries. The percentage was calculated from the actual use percentage of total water deliveries in 2010.
- **Supplier-Produced Groundwater:** Total groundwater well supply is assumed to have a firm capacity of 5 mgd (1,825 million gallons per year) (City of Brentwood 2005, pg. 2-8). Projected use of groundwater was calculated based on 33% of the City of total projected water deliveries. The percentage was calculated from the actual use percentage of total water deliveries in 2010.
- **Recycled Water (WWTP):** The total volume of recycled water in 2010 with use potential was equal to 93% of the total volume of treated water (City of Brentwood 2011b). Therefore, total recycled water supply is assumed to be 93% of the total WWTP capacity. The capacity of the WWTP is expected to expand to 7.5 mgd by 2020; and the plant will need to expand to 25 mgd by 2025 to meet projected wastewater treatment needs based on population growth.

Table 5-1 (DWR Table 16). Water Supplies (current and projected)

Table 16 Water Supplies (current and projected)							
Water Supply Sources		**2010**	**2015**	**2020**	**2025**	**2030**	**2035 (optional)**
Water Purchased From[1]:	Wholesaler Supplied Volume (yes/no)						
ECCID (COBWTP and RBWTP)[2]	Yes	4,823	4,823	4,823	4,823	4,823	4,823
ECCID Raw water[3]	Yes	397	436	430	469	492	513
Supplier-Produced Groundwater[4]		1,825	1,825	1,825	1,825	1,825	1,825
Transfers In							
Exchanges In							
Recycled Water (WWTP)[5]		1,697	1,697	2,546	8,486	8,486	8,486
Desalinated Water							
Total		8,742	8,781	9,624	15,603	15,625	15,647

Source:
[2]1999 agreement between ECCID and the City (Contra Costa Local Area Formation Committee 2007, pg. 3-7).
[3] Public Water Statistic Reports provided by the City for raw water from Roddy Ranch Pump Station on the ECCID Canal.
[4] Firm well capacity of 5 mgd (City of Brentwood 2005, pg. 2-8).
[5] Based on 93% of the total volume of treated water (City of Brentwood 2011b).
Units: million gallons per year.
[1] Volumes shown here should be what was purchased in 2010 and what is anticipated to be purchased in the future. If these numbers differ from what is contracted, show the contracted quantities in DWR Table 17.

Surface Water

Surface water supplies for the City originate from Old River, Middle River and Rock Slough and are transported through the Contra Costa Canal for treatment at the COBWTP and the RBWTP. The City also provides raw water to customers in some portions of the water service area. Table 5-2 describes the amount of water purchased from ECCID in 2010 and the volumes projected to be supplied by ECCID in the future.

Table 5-2 (DWR Table 17). Wholesale Supplies (existing and planned sources of water)

Table 17 Wholesale Supplies (existing and planned sources of water)						
Wholesale Sources[1,2]	**Volume[3]**	**2015**	**2020**	**2025**	**2030**	**2035 (optional)**
East Contra Costa Irrigation District	4,823	4,823	4,823	4,823	4,823	4,823
ECCID Raw water	397	436	430	469	492	513

Source: Public Water Statistic Reports and Well Production Data provided by the City.
Units: million gallons per year
[1] Water volumes presented here should be accounted for in DWR Table 16.
[2] If the water supplier is a wholesaler, indicate all customers (excluding individual retail customers) to which water is sold. If the water supplier is a retailer, indicate each wholesale supplier, if more than one.
[3] Indicate the full amount of water.

City of Brentwood Water Treatment Plant

The COBWTP treats raw surface water from Old River, Middle River, and Rock Slough that was purchased by the City from the ECCID, as described in Table 5-1. The COBWTP was constructed in 2008 adjacent to the RBWTP and employs many of the same treatment technologies because the raw water supply originates from the same source. The COBWTP has the capacity to provide 16.5 mgd but is expandable to 30 mgd when needed to meet increased demands in the future.

Randall-Bold Water Treatment Plant

The RBWTP has been in operation since 1992 and is designed to treat up to 40 mgd. The City has purchased a permanent capacity right of 6 mgd from the RBWTP. However, the contract between CCWD and the City allows the City to purchase additional treated water from CCWD (which is purchased from ECCID). It also permits CCWD to use surplus treatment capacity at the COBWTP, if needed.

Raw water is pumped to the RBWTP from Old River, Middle River, and Rock Slough via the Contra Costa Canal, which is operated by CCWD, for treatment prior to distribution as a public water supply. Water can also be stored in the off-stream Los Vaqueros Reservoir from the Old River intake. During periods of low salinity, raw water is stored in Los Vaqueros Reservoir. This stored water is supplied to the Contra Costa Canal and blended with raw water from the Delta intakes as needed.

Raw Water

The City obtains raw water via the Roddy Ranch Pump Station on the ECCID Canal to the raw distribution system. It is used primarily for irrigation purposes. Current users include golf courses, parks and parkways, schools, and commercial landscaped areas.

Groundwater

Area groundwater is extracted from the San Joaquin Basin. The City is permitted for nine groundwater production wells, but only seven are currently active (Table 3-2). Of the two wells not in use, Well 9 does not currently have a disinfection system, and Well 11 is not used because of high nitrate concentrations. The seven active wells have a combined capacity of 5 mgd and provide approximately 33% of the City's annual water production.

The groundwater quality constituents and respective issues for the City wells can be differentiated into normally occurring constituents and man-made constituents. Historical monitoring of water from the wells has indicated some shallow groundwater impacts from man-made constituents, including nitrates, chloride, and total dissolved solids (TDS). Natural-occurring constituents, however, have required the system to take steps to minimize taste and odor effects prior to the water being delivered to system customers. Table 5-3 summarizes annual pumped groundwater volumes from 2006 to 2010. The percentage of groundwater supply versus total water supply has decreased over the years because of increases in the use of surface water supplies from the COBWTP and recycled water supplies from the BWWTP.

Table 5-3 (DWR Table 18). Groundwater (volume pumped)

Table 18 Groundwater (volume pumped)						
Basin Name(s)	**Metered or Unmetered[1]**	**2006**	**2007**	**2008**	**2009**	**2010**
San Joaquin Basin	Metered	1,886	1,331	1,474	1,235	1,152
Total groundwater pumped		1,886	1,331	1,474	1,235	1,152
Groundwater as a percent of total water supply		48%	30%	33%	29%	29%
Source: Public Water Statistic Reports and Well Production Data provided by the City. Units: million gallons per year. [1] Volume is based on volumetric meter data.						

Table 5-4 describes the volume of groundwater projected to be pumped from 2015 to 2035. Projected percentages of total water supply remain consistent with those in the recent past (i.e., 2009 and 2010).

Table 5-4 (DWR Table 19). Groundwater (volume projected to be pumped)

Table 19 Groundwater (volume projected to be pumped)					
Basin Name(s)	**2015**	**2020**	**2025**	**2030**	**2035 (optional)**
San Joaquin Basin	1,264	1,247	1,359	1,425	1,489
Total groundwater pumped	1,264	1,247	1,359	1,425	1,489
Percent of total water supply	30%	30%	29%	29%	28%
Units: million gallons per year.					

Desalinated Water Opportunities

The City is not planning to build a desalination plant. There are no opportunities for the development of desalinated water as a future supply source within the City's service area because the distance to the Pacific Ocean or the saline waters of San Francisco Bay is a limiting factor.

Transfer Opportunities

The City does not participate in any transfer or exchange programs and does not have any transfer or exchange programs planned for the future.

Recycled Water Opportunities

Recycled water is an important part of the City's water resources. Recycled water allows the City to conserve potable water, thereby ensuring a reliable water supply for current and future demand. The City WWTP is used for treatment and disposal, or reuse, of wastewater generated in the City's service area. Wastewater is collected by gravity in a series of mains, trunks, and interceptors. Collected wastewater is then transported to the WWTP, which currently has a treatment capacity of

5 mgd but is capable of expanding to 10 mgd in 2.5 mgd increments during peak wet-weather flows. In 2010, the average influent to the WWTP was 3.16 mgd. The WWTP's tertiary treatment provides recycled water for landscaping as well as processes at the Antioch Building Materials concrete batch plant. According to the City's 2010 billing records, the WWTP supplied 1.1 million gallons of recycled water to the concrete batch plant and 17 million gallons to five landscape users (e.g., commercial enterprises and parkways) in 2010.

Table 5-5 summarizes the historic and projected volumes of collected and treated wastewater that could be delivered for recycled water uses. In addition, the City's recycled water distribution system is shown in Figure 5-2.

Table 5-5 (DWR Table 21). Recycled Water (wastewater collection and treatment)

Table 21 Recycled Water (wastewater collection and treatment)							
Type of Wastewater	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035 (optional)**
Wastewater Collected and Treated in Service Area	1,168	1,176	2,575	3,974	5,662	7,433	9,276
Volume that Meets Recycled Water Standard[1]	1,087	1,166	2,475	3,819	5,441	7,143	8,915
Source: City of Brentwood 2011b. Units: million gallons per year. [1] Projected values for 2015 and beyond are based on average volumes that met the recycled water standard in 2005 and 2010.							

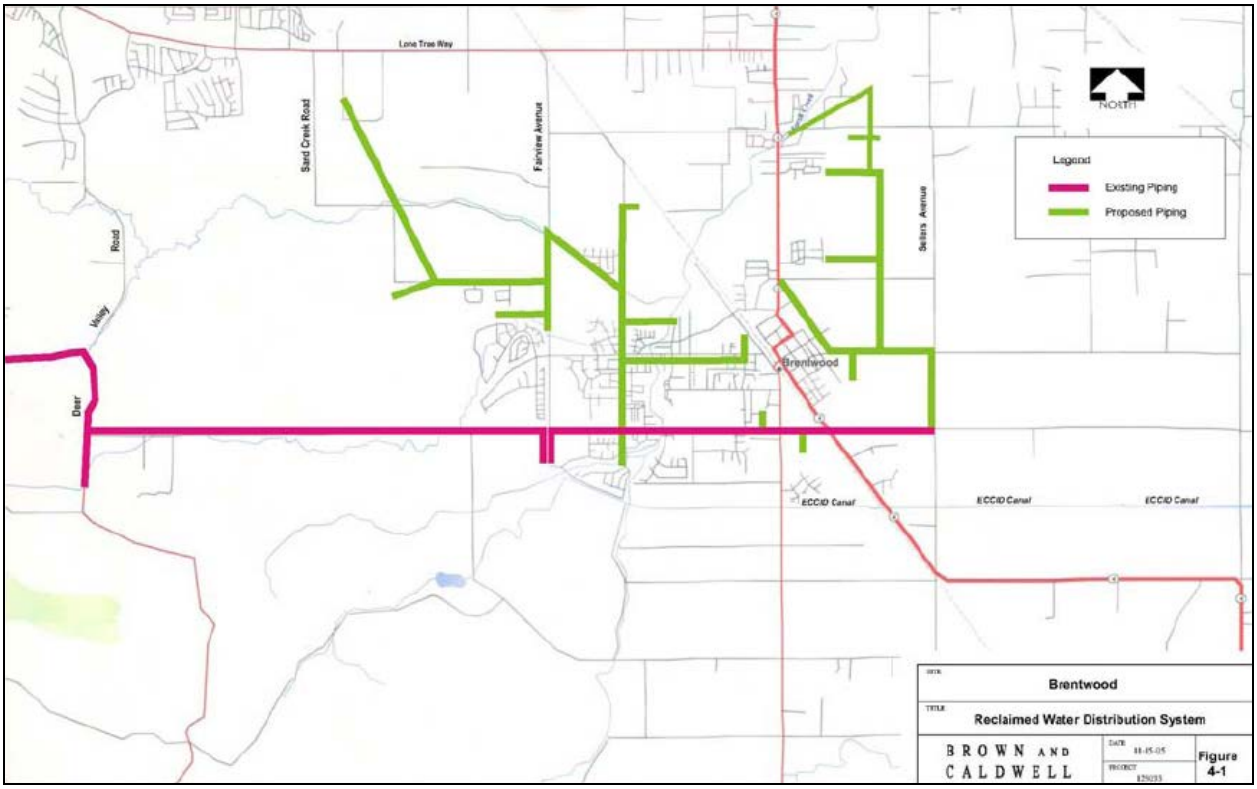

Figure 5-2. City's Existing and Proposed Recycled Water System (City of Brentwood 2006b)

Wastewater from the City that is not reused is treated and discharged to Marsh Creek, which drains to Big Break in the Delta. Annual average and future effluent flows to Marsh Creek are listed in Table 5-6. To minimize discharges to Marsh Creek, the City implements off-site wastewater reclamation under a master reclamation permit that allows for the distribution and use of recycled water within its service area.

Table 5-6 (DWR Table 22). Recycled water (non-recycled wastewater disposal)

Table 22 Recycled water (non-recycled wastewater disposal)							
Method of Disposal	**Treatment Level**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035 (optional)**
Discharge to Marsh Creek	Tertiary	1,115	2,428	3,730	5,241	6,837	8,501
Retention Ponds	Secondary	10	76	117	166	219	273
Total		**1,125**	**2,504**	**3,847**	**5,408**	**7,056**	**8,774**
Source: City of Brentwood 2011b. Units: million gallons per year							

The City has developed preliminary planning documents to identify uses for reclaimed wastewater at both existing and future sites. The reclaimed wastewater will be used for the irrigation of parks, golf courses, and landscape amenities. The City has already constructed a portion of the distribution system for the reclaimed water and will continue to expand the system as the City grows.

Existing landscaping that has the potential to be serviced by reclaimed water includes about 288 acres of parks and golf courses. However, before the City can use recycled water at the several golf courses located within the city limits, on-site groundwater studies will need to be conducted if the golf courses plan to have storage ponds, a requirement of the City's water reclamation permit (Order No. R5-2004-0132) from the Central Valley Regional Water Quality Control Board (Central Valley Regional Water Quality Control Board 2004). The golf courses that may use storage ponds for recycled water include Roddy Ranch, the Brentwood Country Club, the SunCal Company, Deer Ridge, and the Shadow Lakes/Brookfield Homes golf courses.

Other uses for recycled water can include playground irrigation, commercial landscaping, residential irrigation, wetlands maintenance, street sweeping, construction (dust control, soil compaction, and general use), concrete production, log deck irrigation, and industrial process water. Some reclamation uses, such as dust control, have lesser standards, as prescribed in California Code of Regulations Title 22, Recycled Water Criteria, compared with uses such as playground irrigation.

The evapotranspiration data indicate that 4.7 feet of water per acre is required in the City's area. Therefore, the parks and golf courses will require about 5,260 acre-feet (1,714 million gallons) of reclaimed water per year at build out. The current demand for landscape irrigation is estimated at approximately 2,500 acre-feet per year (815 million gallons per year) (City of Brentwood 2006b). Table 5-7 summarizes potential future use of recycled water by use type. The potential for future increases in recycled water use is greatest in the landscape sector, including several golf courses and future parkways, as well as the "other" sector (e.g., fire hydrants can be converted to recycled water sources and raw water customers can convert to recycled water).

Table 5-7 (DWR Table 23). Recycled Water (potential future use)

Table 23 Recycled Water (potential future use)							
User Type	**Description**	**Feasibility[1]**	**2015**	**2020**	**2025**	**2030**	**2035 (optional)**
Agricultural Irrigation							
Landscape Irrigation[2]	X	Currently being used and has potential for increased use	17.2	42.8	128.1	211.4	293.8
Commercial Irrigation[3]	X	Is currently being used where available	N/A	N/A	N/A	N/A	N/A
Golf Course Irrigation	X	Requires groundwater study					
Wildlife Habitat							
Wetlands							
Industrial Reuse	X	Is currently being used at a concrete batch plant	1.1	1.1	1.1	1.1	1.1
Groundwater Recharge							
Seawater Barrier							
Geothermal/Energy							
Indirect Potable Reuse							
Other[4]	X	Planned for future use.	0	32.6	114.6	114.6	156.6
Total		**0**	**18**	**77**	**244**	**327**	**452**

Units: million gallons per year.

[1] Technical and economic feasibility.

[2] Includes commercial and golf course irrigation. Landscape irrigation includes parks, schools, cemeteries, churches, residences, or public facilities.

[3] Includes commercial building uses (e.g., landscaping; toilets; heating, ventilation, and air conditioning; etc.) and commercial uses (e.g., car washes, laundries, nurseries, etc.). Potential future use could not be quantified because the recycled water volumes used for commercial irrigation are included in landscape irrigation use volumes.

[4] Includes metered water used for construction, emergency response involving fire hydrants, and other activities. The hydrant meters are read quarterly.

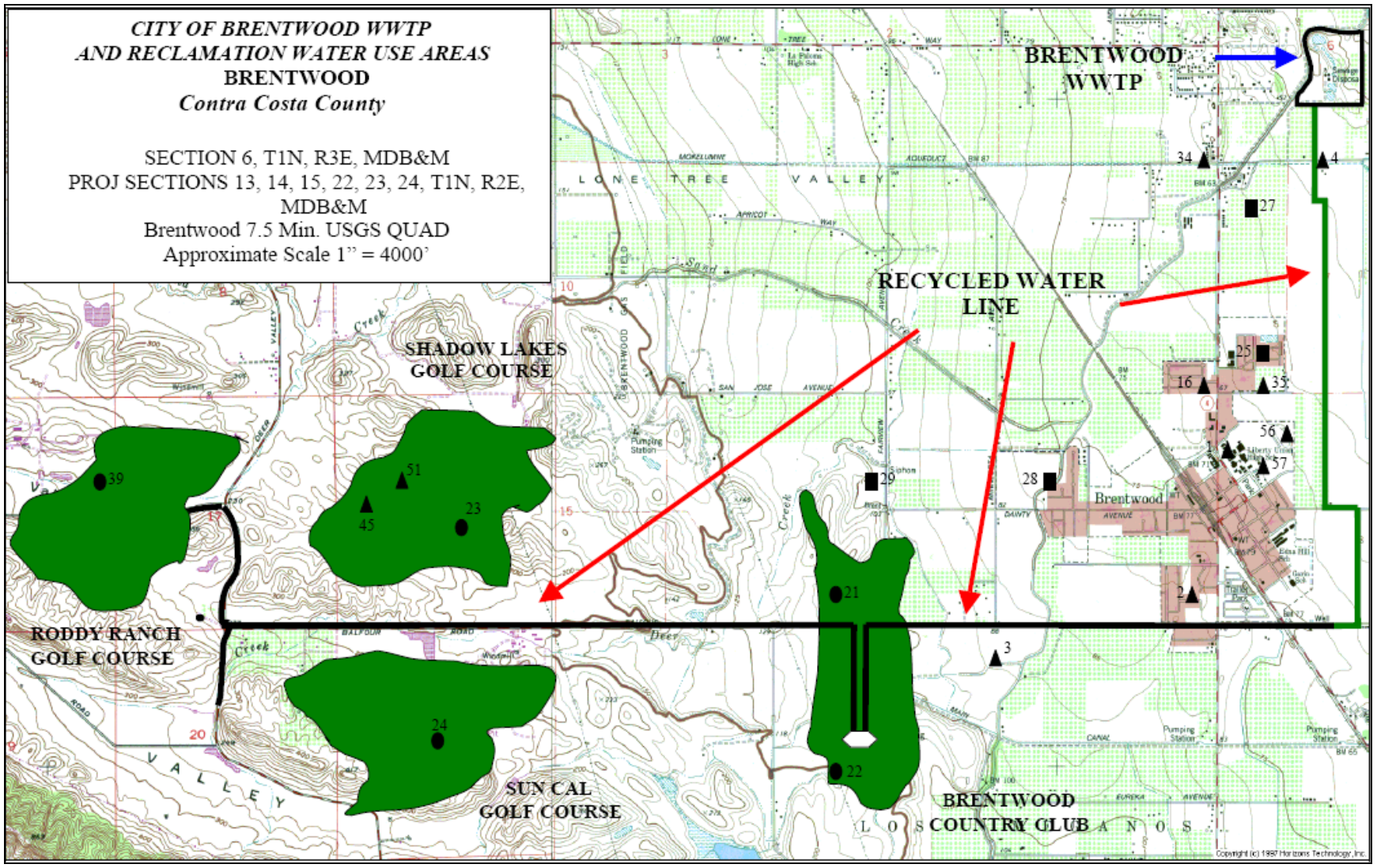

Figure 5-3. City Wastewater Treatment Plant and Reclamation Water Use Areas (Central Valley Regional Water Quality Control Board 2004)

Table 5-8 compares 2010 recycled water use, as projected in the 2005 UWMP (City of Brentwood 2006b), to actual 2010 water use by type. Actual recycled water use in 2010 was much less than that projected in the 2005 UWMP. Agricultural and wildlife projections were not met because the City does not deliver water to agricultural users, nor does it quantify wildlife habitat water use. Recycled water use in the industrial sector is limited because only one industrial facility is located in the City. Landscape water use was much less than projected primarily because of the conversion of Sunset Parks from recycled to potable water. However, the numbers for this use type are expected to increase significantly in future projections.

Table 5-8 (DWR Table 24). Recycled Water (2005 UWMP use projection compared with 2010 actual)

Table 24 Recycled Water (2005 UWMP use projection compared with 2010 actual)		
Use Type	**2010 Actual Use**	**2005 Projection for 2010[1]**
Agricultural Irrigation		8
Landscape Irrigation[2]	17	261
Commercial Irrigation[3]		
Golf Course Irrigation		
Wildlife Habitat		2
Wetlands		
Industrial Reuse	1	8
Groundwater Recharge		
Seawater Barrier		
Geothermal/Energy		
Indirect Potable Reuse		
Total	**18**	**279**

Units: million gallons per year
[1] From the 2005 UWMP. There has been some modification of use types. Data from the 2005 UWMP can be left in the existing categories or modified to the new categories at the discretion of the water supplier.
[2] Includes parks, schools, cemeteries, churches, residences, or public facilities.
[3] Includes commercial building uses (e.g., landscaping; toilets; heating, ventilation, and air conditioning; etc.) and commercial uses (e.g., car washes, laundries, nurseries, etc.).

Methods to Encourage Recycled Water Use

The City wants to expand the use of recycled water by offering financial incentives. The City currently offers potable water at $2.87 per 1,000 gallons. This rate is almost three times that of recycled water, which is $0.97 per 1,000 gallons. In addition, the City will maintain the cost of recycled water proportionally lower than of potable water in the future. City hopes to increase recycled use amongst the number of large-volume customers in the future as they realize that operating costs can be reduced from the use of recycled water. This includes customers who are responsible for golf courses, roadway irrigation, and parks.

There are currently two projects which are aimed at increasing the use of recycled water. The first is a Capital Improvement Project (CIP), Raw Water Distribution System project, which will convert a large part off potable water to recycled water and improve the access to recycle water supplies. The

second is pursuing providing recycled water to the golf courses. The Central Valley Regional Water Quality Control Board requires a groundwater study be conducted at each golf course site before the City can supply the recycled water to the golf courses. The City is currently pursuing alternatives to this requirement.

The City is also exploring the opportunity to expand the use of recycled water during construction by banning local contractors from using potable water for dust control and earth compaction. This would require the adoption of a City ordinance and some fire hydrants systems to be converted to recycled water piping systems.

Table 5-9 describes the methods the City currently implements and plans to implement in the future to encourage recycled water use among its customers.

Table 5-9 (DWR Table 25). Methods to Encourage Recycled Water Use

Table 25 Methods to Encourage Recycled Water Use						
Actions	Projected Results					
	2010	2015	2020	2025	2030	2035 (optional)
Financial incentives - Low Recycled Water Cost	Recycled water at a decreased rate reduces potable and raw water use.					
Increase Recycled Water Access Opportunities	NA	Conversion of potable water lines to recycled water lines will Improve access to recycled water will reduce the volume of potable and raw water use.				
Regulatory Incentives	NA	City ordinance on banning potable water use for dust control and earth compaction for construction projects.				

Future Water Projects

The City's primary future water supply projects are described in the City's 2010/11–2014/15 Capital Improvement Program (City of Brentwood 2010b). The following projects are those in the Water Improvements section of the City's capital improvement program. Water improvements include items such as major transmission mains, new water sources, booster stations, water wells, reservoirs, and treatment facilities.

- **Brentwood Boulevard Sewer and Water Main:** This project involves the installation of a 12-inch sewer main and a 12-inch water main, approximately 2,300 feet, along Brentwood Boulevard from Lone Tree Way to the northerly city limits as well as lateral stubs for Sims Road and service laterals for existing properties along Brentwood Boulevard. This project will provide sewer and water service for existing residents as well as for future development along Brentwood Boulevard north of Lone Tree Way.
    - **Timeline:** This project is contingent upon future development along Brentwood Boulevard. Currently scheduled to begin 2014/15.
    - **Funding:** The funded portion of this project will be split between two facility fees, water and wastewater.
- **Chlorine Generator Upgrade:** This project involves the upgrade of power supplies and components for the on-site sodium hypochlorite generators at Wells 6, 7, 8, 11, 12, 13, 14, and

15. The existing power supplies that are in use, which are obsolete and have proven themselves unreliable, are being replaced with new, more robust power supplies. This will relocate the power supplies away from the Programmable Logic Controller, thereby reducing failures. Replacing the power supplies as needed at Wells 8 and 15 will help to ensure a safe, reliable disinfection system for the City's water supply. This project is systematically replacing the power supplies so that not all wells are out of service at the same time. Thus far, Wells 6, 7, 11, 12, 13, and 14 have been upgraded.

  - **Timeline:** Complete.

- **Downtown Infrastructure:** This project includes the installation of new water and sewer facilities, the rehabilitation of existing facilities, and either the removal or replacement of existing infrastructure to accommodate future redevelopment and correct existing operations and maintenance constraints due to the age of the facilities.

  - **Timeline:** Complete.
  - **Funding:** The funds for this project will come from the redevelopment agency's 2001 bond proceeds in agency cash, the Water Enterprise Fund, and the Wastewater Enterprise Fund.

- **RBWTP Maintenance and Capital Upgrades:** This project involves the upgrade or replacement of existing plant facilities, including the installation of new facilities, due to wear and tear or new treatment standards. The City purchased 6 mgd of treatment capacity from the RBWTP in 2003. Therefore, the City has a fair share responsibility for capital as well as replacements and upgrades for operations based on the capacity right and total plant capacity.

  - **Timeline:** This project is currently under way and ongoing.
  - **Funding:** Funding from facility fees is generally for capital upgrades where the operational replacements are being funded through the enterprise. Per the agreement with CCWD, these replacement and upgrade project costs and priorities are reviewed in conjunction with CCWD on an annual basis.

- **Sensus Automated Meter Reading System Upgrade:** This project involves the installation of a fixed-base Sensus meter reading system to provide hourly meter readings. This will require the installation of a centrally located antenna and the replacement of the multiplexer units on the water meters. Upgrading the current Sensus automated meter reading system to an automated meter reading/advanced metering infrastructure fixed-base system will eliminate the need to drive routes to obtain meter readings. With the new system, meter readings will be available on an hourly basis and downloaded four times a day. Fixed base is a proactive metering solution with the ability to notify the staff of leaks, high consumption, and water theft when they occur. This will reduce water loss within the City. Upgrading the current system will reduce staff time spent reading meters and allow for proactive customer service. Utility billing will have access to the meter readings on an hourly basis, thus eliminating the need to contact public works staff to provide reads for occupant changes.

  - **Timeline:** This is a multi-phase project. The first phase will evaluate the system and communication requirements. The second phase will consist of upgrading the water meters (citywide) one zone at a time. This project is scheduled to begin 2013/14 and be completed 2017/18.
  - **Funding:** Overall costs for the project will come from water enterprise fees.

- **Surface Water Treatment Facility Phases I and II:** Phase I consists of preparing all necessary environmental documents to jointly expand or construct a new facility adjacent to the RBWTP, including the necessary pumping and distribution facilities. Phase I will also consist of design and construction of the ultimate pumping facilities and main trunk line to the City's distribution system and all related appurtenances. Phase II will consist of the design and construction of a new facility, with CCWD to treat the City's surface water supply to potable drinking water standards to accommodate the ultimate water consumption demands of the City. This is required to provide a safe, reliable source of potable water to the potable water customers of the City. Phase I of the project has been constructed and has been in service since spring 2006. Phase II began construction in fall 2006 and was substantially completed in fall 2008, with project administration and closeout remaining.
    - **Timeline:** This project is currently under way and pending closeout. Phase 1 is complete. Phase II will be scheduled based upon need at a later date.
    - **Funding:** The overall costs for this facility will be split by the water enterprise (60%) and water facility fees (40%).
- **Underground Water System Corrosion Mitigation:** This project will install cathodic protection systems on metallic water lines, valves, and fittings on fire hydrants, as required. Cathodic protection is an efficient and cost-effective method of protecting the buried metallic structure from either costly repairs or future replacement due to corrosive soils. This project will reduce and prevent the amount of emergency work on the water facilities due to ruptures caused by corrosion. This project will also minimize the amount of water lost each year due to leakage from corrosion.
    - **Timeline:** This project is currently in the design phase and projected to begin construction in 2013/14.
    - **Funding:** The overall costs for this facility will be split by the water enterprise and water facility fees.
- **Water Distribution Supervisory Control and Data Acquisition (SCADA) System Upgrade:** This project involves the addition of a SCADA monitoring station and an upgrade of the SCADA Alarm and iFIX operating system from version 3.5 to version 5.0. This will include the iFIX Plus SCADA Pak Unlimited Developer version 5.0 for two SCADA monitoring stations. Update programming on Programmable Logic Controller's to allow data to be efficiently stored in the SCADA system's data concentrator. The SCADA software currently used by the City, iFIX version 3.5, is out of date and no longer supported by the manufacturer. Upgrading to SCADA Alarm and iFIX 5.0 is necessary to ensure that SCADA continues to operate correctly and efficiently. Programmable Logic Controller data will be used to produce auto-generated production reports. Upgrading the software will bring the SCADA system up to date and provide needed technical support for the SCADA Alarm and the iFIX operating system. Adding the additional SCADA workstation will provide the needed redundancy in the event the current SCADA workstation fails or needs repair.
    - **Timeline:** Complete.
    - **Funding:** The overall costs for this project will come from water enterprise fees.
- **Water Distribution System Rehabilitation:** This project involves the replacement of leaking or non-operable valves, the installation and construction of tie-ins and loops, and the

installation and repair of fire hydrants, air reducing valves and sample stations, as well as other distribution system components. Improvements to the distribution system are required to ensure delivery of water in compliance with state and federal water quality regulations. This project allows the City to be proactive in water distribution system maintenance and repair, thereby reducing water loss within the City. Project improvements will reduce service requests and customer complaints and improve flushing and shutdown capabilities. Efforts will focus on older valves that may be broken or damaged.

  - **Timeline:** This project is currently in the construction phase and ongoing.
  - **Funding:** The overall costs for this project will come from water enterprise fees.

- **Water System Connections/Regulating:** This project involves the installation of additional connections throughout the City, including across the Union Pacific Railroad, Marsh Creek, and the State Route 4 Bypass, to ensure an adequate flow of water throughout the City. It also involves the installation of pressure regulating stations, zone cross connections, and flow monitoring stations to stabilize water pressure and volumes in specific water zones during peak demand. This project is necessary to ensure adequate flow between the City's potable water wells, reservoirs, and end users. This project will also minimize pressure drops during peak demands, ensure that adequate fire flow is maintained, and provide a "looped" system to safeguard water quality. This project is intended to improve water flow throughout the City and stabilize volumes and pressure during peak demands by increasing the number and diameter of transmission mains throughout the City, including across the railroad, Marsh Creek, and the State Route 4 Bypass, as well as installing pressure-regulating stations and zone cross connections.
  - **Timeline:** This project is currently under way and projected for completion in 2014.
  - **Funding:** This project is funded by facility fees because of the potential impact new development can have on the potable water system.
- **Zone I Equalization Storage Reservoirs:** A series of buried equalization basins, totaling 10 million gallons of storage, will be constructed in multiple phases. Each phase will consist of a buried, reinforced concrete reservoir; piping; pumps and related equipment; electrical services; and control systems. System storage capacity, among other things, provides the equalization volume required to accommodate maximum water consumption periods throughout the day. All of the City's existing storage capacity is located on the western edge of the City because of the hilly terrain (typically, water reservoirs are elevated above the service area and rely upon gravity for flow). Adequate locations for additional Zone I reservoirs are currently not available within the city limits; therefore, buried equalization basins are proposed on the eastern edge of the City.
  - **Timeline:** It is proposed that these basins be constructed in phases, as water demands dictate, and re-evaluated on an annual basis to determine when it is most advantageous to construct each reservoir. This project is currently under way and projected to be constructed by 2015.
  - **Funding:** The overall costs for this project will come from water facility fees.

The following projects from the Wastewater Improvements section of the City's capital improvement program are relevant to this UWMP. The most relevant items involve existing and proposed reclaimed water pipes and the City WWTP expansion and capacity improvements.

- **Neroly Road Recycled (Reclaimed) Water Conversion:** Construct 3,500 feet of 10-inch raw water line along Neroly Road and 2,400 feet of 8-inch raw water line along the Union Pacific Railroad, with the necessary appurtenant structures. The landscape along this stretch of roadway is currently using potable water. By converting to raw water, the City can reduce the cost of landscape irrigation and conserve potable water. This potable water can further be used to meet peak demands in summer and reduce water purchases and treatment costs. It will be beneficial for the City for long-term planning and resources to convert potable water for landscape irrigation whenever possible. O'Hara Avenue has a raw water line that terminates at Neroly Road, and more recycled water will become available from the City WWTP for use.
    - **Timeline:** This project will begin once funds are allocated.
    - **Funding:** This project is currently unfunded.
- **Recycled Water Distribution System—Phase II:** This project involves the installation of a trunk, a reclaimed (raw) water system (12 to 20 inches in diameter), booster pump stations, and storage reservoirs. In addition, irrigation conversions would be made to irrigate golf courses, parks, parkways, and medians citywide. This project is required as a part of the City's urban water conservation plan to minimize the use of potable water for irrigation purposes. The City is exploring and implementing options ranging from increased use of reclaimed water from the WWTP to using raw water from ECCID, where available, for irrigation purposes.
    - **Timeline:** This project is currently underway.
    - **Funding:** This project is funded through wastewater facility fees. However, the City is concurrently looking for state and federal grant funding, development contributions, and possibly zero- or low-interest loans from the state to accelerate the construction of this project as well as the other phases of the raw system.
- **Recycled Water Distribution System—Phase III**: This project involves the installation of a trunk and a reclaimed (raw) water system throughout the City to provide reclaimed water for irrigation at golf courses, parks, parkways, medians, and other applicable uses. This is the third and final phase of the raw water distribution system. Several cost-effective facilities were installed with Phases I and II. This final phase encompasses various improvements and provides distribution facilities to remote areas. However, it may not be cost effective to provide service to all areas.
    - **Timeline:** This project is scheduled to begin in 2014/15.
    - **Funding:** This project represents a placeholder should state or federal funding become available. The City is actively seeking state and federal grant funding and development contributions for the construction of this project as well as the other phases.
- **Wastewater Treatment Plant Expansion—Phase II:** The existing 5 mgd tertiary treatment facility was planned and constructed to accommodate future expansion, up to 10 mgd, by adding oxidation ditches and secondary clarifiers, converting chlorine contact facilities to ultraviolet disinfection, and installing filters and all related appurtenances. The plant is capable of being expanded in 2.5 mgd increments. Therefore, based on the growth rate in the City and the final build out population, the Phase II project could expand to 7.5 mgd, with the ultimate 10 mgd reached under Phase III. This project is necessary to keep the City in compliance with stringent discharge requirements. The expansion will also accommodate planned and approved development within the City.

- **Timeline:** This project is currently underway and is projected to be completed in 2015/16.
- **Funding:** Funding for this project includes wastewater facility fees, the Wastewater Enterprise Fund, and the State Revolving Fund Loan.

Chapter 6
Water Supply Reliability and Water Shortage Contingency Planning

Water Supply Reliability

The surface water supply reliability results from a pre-1914 water right purchased from ECCID, giving the City first rights to 14,800 acre-feet (4,823 million gallons) per year. The City's contract with CCWD to treat its surface water supply at the COBWTP and RBWTP is only limited by the ECCID entitlement of 14,800 acre-feet.

Contra Costa County does not regulate groundwater pumping with water rights. Environmental factors, such as drought conditions, and water quality factors, such as groundwater contamination, can affect the availability of supply, however. Although current groundwater levels and raw water delivery rates are assumed to be constant for this 2010 UWMP, the City is aware that future conditions may vary. It is prepared to adaptively manage any changes that may occur because of extended drought or potential effects of climate change.

Table 6-1 describes legal, water quality, and climatic factors that may affect the reliability of the water supply for the City.

Table 6-1 (DWR Table 29). Factors Resulting in Inconsistency of Supply

Table 29 Factors Resulting in Inconsistency of Supply							
Water Supply Sources[1]	**Specific Source Name (if any)**	**Limitation Quantification**	**Legal**	**Environmental**	**Water Quality**	**Climatic**	**Additional Information**
Purchased from CCWD (RBWTP) (treated surface water)	Raw Water (ECCID)	The City has purchased a permanent capacity of right of 6 mgd at the RBWTP	Water Rights	Catastrophic levee breach could compromise surface water supply	High TDS and nitrate levels could compromise supply.	None	
Supplier-Produced Surface Water (COBWTP)	Raw Water (ECCID)	Portion of contracted 4,823 million gallons per year (13.2 mgd). Plant capacity = 15 to 30 mgd	Water Rights	Catastrophic levee breach could compromise surface water supply	High TDS and nitrate levels could compromise supply.	None	
Raw Water	Roddy Ranch Pump Station		Water Rights	Catastrophic levee breach could compromise surface water supply	High TDS and nitrate levels could compromise supply.	None	East Contra Costa Canal Irrigation shutdowns and water supply will be coordinated between the City and ECCID as required.
Supplier-Produced Groundwater	San Joaquin Groundwater Basin	1,625 million gallons per year (4.5 mgd)	Water Rights		High TDS and nitrate levels could compromise supply.	None	
Recycled Water	City WWTP	5–10 mgd	Master Reclamation Permit Requirements		If tertiary-level water quality requirements are not met, flows are sent to reclamation ponds for analysis.	None	Recycled water irrigation may affect groundwater quality. Groundwater studies are conducted at golf courses prior to recycled water irrigation.
[1] From DWR Table 16.							

Water Quality Effects on Water Supply Reliability

This section describes how water quality may affect the City's water management strategies and discusses supply reliability for surface water, groundwater, and recycled water deliveries.

Surface Water

Water quality fluctuates throughout the year, as well as from year to year, for each of the three surface water sources from the Contra Costa Canal (Old River, Middle River, and Rock Slough). Raw water from the Delta is considered a high-quality source and characterized by low to moderate levels of turbidity, minerals, and natural organic matter. Pathogenic organisms are typically low as well (City of Brentwood 2005). Water from the Contra Costa Canal is routinely monitored for pesticides and other contaminants (e.g., synthetic organic compounds, nitrate, radionuclides, perchlorate, arsenic, etc.); however, these regulated compounds are typically not detected in Delta water supplied via the Contra Costa Canal. Because of weather variations, storm events, and diurnal patterns, water quality in the Contra Costa Canal can vary seasonally, daily, or even hourly. The variation in water quality is partially compensated by changing the flow rates of the various intake sources along the canal.

The RBWTP and the COBWTP are able to treat changing raw water quality with consistent results. For example, the existing facilities can respond to changes in raw water turbidity or other quality changes. All current standards for treated water from the RBWTP and the COBWTP, as stipulated in the waste discharge requirements from the Central Valley Regional Water Quality Control Board (Order No. R5-2007-0048), are being met.

Groundwater

Groundwater is treated with chloramines at the wellheads and pumped to the distribution system directly. Water quality in the City aquifer is adequate, but the water does have relatively high levels of TDS, chlorides, and nitrate. TDS in the groundwater is high, up to 798 milligrams per liter (mg/L) (City of Brentwood 2006b). However, this is below California's maximum contaminant level of 1,000 mg/L. The occurrence of nitrate in groundwater in this area has generally been attributed to agricultural influences. However, the occurrence is limited to the upper sequences of aquifer materials. The nitrate concentrations decline appreciably for wells 200 feet or more below the ground surface. The City's seven active wells are below 20 parts per million; an inactive well (Well 11) is above 20 but still below the limit of 45 parts per million. Chloride and TDS concentrations also decline with depth but less notably than nitrate concentrations. The decline suggests local anthropogenic influences on TDS, chloride, and other constituents in addition to nitrate. As shown in Table 3-2, two of the nine permitted wells are not in use because of issues related to water quality (i.e., one does not currently have a disinfection system [Well 9], and the other has high nitrate concentrations [Well 11]).

After delivery to the City's distribution system, treated surface water is blended with chloraminated groundwater from City wells. The City adjusts pH levels with liquid sodium hydroxide to maintain the pH in the finished water from the COBWTP between 7.7 and 8.0 units. These pH adjustments reduce the corrosive effects of treated surface water from the COBWTP on pipes and plumbing fixtures after blending operations. It is a safe and economical way for the City to maintain good water quality (City of Brentwood 2005).

Recycled Water

The City WWTP is capable of producing high-quality tertiary effluent that complies with California Water Code Title 22 recycling criteria. The WWTP system consists of screening, grit removal, oxidation and nitrification (by extended aeration of activated sludge), denitrification (by anoxic basins), coagulation, tertiary treatment filtration, chlorination, and dechlorination.

Table 6-2 summarizes the potential water quality impacts on water supplies. The only impact resulting in a volume change is groundwater related because of two inactive wells with a combined capacity of approximately 10 million gallons per year.

Table 6-2 (DWR Table 30). Water Quality (current and projected water supply impacts)

Table 30 Water Quality (current and projected water supply impacts)							
Water source	**Description of Condition**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035 (optional)**
Groundwater	High TDS, chlorides, and nitrates	-10	-10	-10	-10	-10	-10
Surface Water	Salinity/turbidity	0	0	0	0	0	0
Recycled Water	Tertiary-level standards	0	0	0	0	0	0
Units: million gallons per year.							

Water Shortage Contingency Planning

This section describes emergency preparedness plans that would be implemented in the event of a catastrophic reduction in water supplies and the City's mandatory prohibitions against specific water use practices during water shortages. A copy of the City's Draft Water Shortage Contingency Resolution and Water Shortage Contingency Plan are in Appendix E.

Catastrophic Supply Interruption Plan

CWC Section 10632(c) requires certain actions to be undertaken by the water supplier during a catastrophic interruption in water supplies. To that end, the City has a water quality emergency notification plan in place to coordinate the overall response to a disaster. A catastrophic event resulting in a water shortage would be any event, either natural or man-made, with severity equal to or greater than Stage III or Stage IV (severe or critical drought) water supply shortage conditions. See Table 6-10 and the associated discussion below for definitions of the water supply condition stages. Examples of such events are earthquakes, regional power outages, floods, and fires. To ensure preparedness, facilities in the City are inspected annually for earthquake safety. Furthermore, the City has budgeted for or installed auxiliary generators and made improvements to water storage facilities as part of the annual construction process to prevent a loss of these facilities during an earthquake or any disaster that would cause a power outage.

Table 6-3 describes the actions taken to address each catastrophic event.

Table 6-3. Catastrophic Supply Interruption Actions

Potential Catastrophic Event	Summary of Actions
Earthquake/Fault Rupture, Liquefaction	Emergency response plan procedures would be implemented. The City would ensure that any damaged sections of the distribution system would be isolated, customers would be notified of the need to reduce use, backup generators would be used for groundwater pumping, and the water supply would be supplemented by using stored surface water supplies from the City's five reservoirs.
Regional Power Outage	Customers would be notified of the need to reduce use, and backup generators would be used for groundwater pumping.
Flooding/Levee Breach/ Dam Failure	Emergency response plan procedures would be implemented. Depending on the level of flooding, flooded areas would be isolated to minimize the size of the area affected by the event; customers may be evacuated.
Fire	Affected customers would be notified and voluntary and mandatory rationing would be implemented in affected areas, if necessary.

Mandatory Prohibitions during a Water Shortage

CWC Section 10632(d) requires mandatory prohibitions against specific water use practices that may be considered excessive during water shortages. Table 6-4 identifies mandatory prohibitions and the stages during which the prohibitions would be voluntary or mandatory. Where there is no stage number, the action is voluntary. See Table 6-10 and the associated discussion below for definitions of the water supply condition stages.

Table 6-4 (DWR Table 36). Water Shortage Contingency (mandatory prohibitions)

Table 36 Water Shortage Contingency (mandatory prohibitions)	
Examples of Prohibitions	**Stage When Prohibition Becomes Mandatory**
Cleaning sidewalks, streets, walkways, parking areas, patios, porches, or verandas	III, IV
Washing cars	II, III, IV
Watering lawns/landscaping	II, III, IV
Non-permanent agriculture	II, III, IV
Uncorrected plumbing leaks	II, III, IV
Gutter flooding	III, IV
Cleaning/filling/operating/maintaining water levels in non-recycling decorative fountains	II, III, IV

Consumption-Reduction Methods

Each urban water supplier has a choice regarding the types of consumption-reduction methods to use in its water shortage contingency analysis. The methods must be appropriate for the area and capable of reducing water use by up to 50%. CWC Section 10632(e) requires the water supplier to implement consumption-reduction methods during the most restrictive stages of a water shortage.

The City will implement the consumption-reduction methods listed in Table 6-5. See Table 6-10 and the associated discussion below for definitions of the water supply condition stages.

Table 6-5 (DWR Table 37). Water Shortage Contingency (consumption-reduction methods)

Table 37 Water Shortage Contingency (consumption-reduction methods)		
Consumption-Reduction Methods	**Stage When Method Takes Effect[1]**	**Projected Reduction (%)**
Demand-Reduction Program	All	10%–50%
Reduce Pressure in Water Lines	N/A	
Flow Restriction	III, IV	35%–50%
Restrict Building Permits	N/A	
Restrict Use for only Priority Uses	II, III, IV	20%–50%
Use Prohibitions	II, III, IV	20%–50%
Water Shortage Pricing	N/A	
Per Capita Allotment by Customer Type	III, IV	35%–50%
Plumbing Fixture Replacement	All	10%–50%
Voluntary Rationing	II	20%
Mandatory Rationing	III, IV	35%–50%
Incentives to Reduce Water Consumption	N/A	
Excess Use Penalty	III, IV	35%–50%
Water Conservation Kits	All	10%–50%
Education Program	All	10%–50%
Percentage Reduction by Customer Type	III, IV	35%–50%
[1] N/A (not applicable) indicates that this method will not be implemented by the City as a water shortage contingency.		

Penalties or Charges for Excessive Use

CWC Section 10632(f) requires a water supplier to penalize or charge for excessive water use, when applicable. The City, after one written warning, shall install a flow-restricting device on the service line of any customer who is observed by City personnel using water for a non-essential or unauthorized use, as defined by City ordinance.

An excess-use penalty (i.e., per 1,000 gallons] of water used in excess of the applicable allocation during each billing period) shall be charged by the City for all service rendered on or after the effective date of an ordinance. Repeated violations of unauthorized water use will result in a termination of water service. Penalties and charges, as well as the stage during which they take effect, are displayed in Table 6-6.

Table 6-6 (DWR Table 38). Water Shortage Contingency (penalties and charges)

Table 38 Water Shortage Contingency (penalties and charges)	
Penalties or Charges	**Stage When Penalty Takes Effect[1]**
Penalty for Not Reducing Consumption	III, IV
Charge for Excess Use	III, IV
Flat Fine	N/A
Charge per Unit over Allotment	III, IV
Flow Restriction	III, IV
Termination of Service	III, IV
[1] N/A (not applicable) indicates that this penalty or charge will not be implemented by the City as a water shortage contingency.	

Revenue and Expenditure Impacts during Shortages

CWC Section 10632(g) requires an analysis of the impacts of each action taken for conservation and water restriction on the revenues and expenditures of the water supplier. The City will establish record of accounts to track expenses and revenue shortfalls caused by both mandatory rationing and voluntary conservation efforts. Currently, the City operates on a no-profit basis; revenue generated from water sales and fixed fees is used to cover the cost of operation including overhead (City of Brentwood 2007b and 2007c). The City imposes fixed fees for each connection it distributes water to, the revenue generated by these fixed fees, or fixed revenue, will not change during drought conditions as these fees will stay in place. However, the amount of revenue generated through water sales will vary during drought conditions, and thus is referred to as variable revenue. To determine the economic impacts of water shortage on the City's budget, average revenue over a four year period was considered (fiscal years 2004/2005 – 2007/2008) as representative of typical conditions; the average annual revenue generated during this time was approximately $14,348,000.

State law requires the City of Brentwood to set rates sufficient to cover operating expenses for the water and wastewater enterprises involving debt service and to provide funds for the replacement of facilities. It does this by examining operational costs, material and supply costs, debt services, normal additions and replacements of the existing system, administrative costs and capital improvement programs and then distributes these costs appropriately among the purchasers of water and wastewater customers. The City reviews its revenue and expenditures related to water on an annual basis and uses annual trends to adjust customer water rates on a periodic basis through the development of a rate study. The City will continue this review and adjustment of revenue with the goal of continuing to meet the needs of its customers and residents.

A reduction in water supply would reduce revenue generated through water sales and add additional financial burden due to the implementation of water use reduction measures. An approximation of the reduction in revenue expected at various reductions in water use is summarized in Table 6-7. The estimated values shown in the table assume that the specified reduction in water consumption occurs for an entire fiscal year. The values shown in Table 6-7 are based on hypothetical situations of year-long water shortages.

Table 6-7. Breakdown of Expected Financial Impact Due to Water Shortage

Expected Financial Impact Type	Percent Water Sales Reduction			
	10%	20%	35%	50%
Estimated Revenue Reduction (Loss) [from reduced variable income]	($997,925)	($1,995,855)	($3,492,740)	($4,989,630)
Estimated Additional Operating Cost (Loss) [from increased demand of staff]	$0	($75,000)	($225,000)	($225,000)
Estimated Cost of Implementing Conservation Measures (Loss)	($165,330)	($165,330)	($325,330)	($325,330)
Total Estimated Revenue Loss (S)	($1,163,255)	($2,236,185)	($4,043,070)	($5,539,960)
Total Estimated Revenue Loss (as % of average annual income)	(8.1%)	(15.6%)	(28.2%)	(38.6%)

The table demonstrates that reduction in water use results in at least a temporary deficit in revenue. To offset the financial impacts of a reduction in water use, the City may impose a surcharge during reduced water consumption. CWC Sections 350-359 allow the governing body of a public water supply to declare a water shortage emergency at times when the governing body determines that water demand cannot be met without depleting the water supply to a detrimental level. The code further specifies that after an emergency condition of water shortage has been established, the governing body can adopt regulations and restrictions regarding the delivery and consumption of water. Therefore, to impose a surcharge on water delivery the City would first have to declare a water shortage emergency. Once the City has declared a water shortage emergency a water surcharge could be imposed to offset reduced revenue. The City is in the process of adopting a new municipal code that allows the City to adopt any necessary rules or regulations in accordance with CWC Sections 350-59 in the event of a water shortage emergency caused by drought or other circumstance.

As Table 6-7 demonstrates, any reduction in water consumption below normal results in a deficit. The reduction in consumption is not directly proportional to the reduction in revenue, as the City imposes both fixed and variable fees. A 10% reduction in consumption for an entire year results in an 8.1% reduction in revenue; the City anticipates that should such a reduction occur, the deficit may be offset through budgetary means, such as delaying improvement projects, delaying salary increases, and reductions in purchase water, without the need to impose surcharges. Reductions in water consumption of 20%, 35% and 50% result in 15.6%, 28.2%, and 38.6% annual budget deficit, which result in large enough impacts on revenue to trigger the need for additional means, such as surcharges, to address revenue shortfalls.

As previously mentioned, the values shown in Table 6-7 are based on hypothetical situations of year-long water shortages. Should an actual water shortage occur, the City will work to address any budget deficit internally first prior to applying a surcharge. If a surcharge is necessary, the City will work diligently to determine the minimum surcharge required that will allow the City to continue to deliver safe, clean water to its customers.

Draft Water Shortage Contingency Ordinance

Should drought conditions warrant mandatory reductions during Stage II of a water supply shortage, the City may adopt and implement an ordinance for mandatory conservation as well as a water restriction plan (see Table 6-10 and the associated discussion below for definitions of the water supply condition stages). This ordinance may require additional tariffs for the City to enforce the plan. The ordinance may address prohibitions on various wasteful water uses, including washing sidewalks and driveways with potable water, cleaning or filling decorative fountains, or allowing plumbing leaks to go uncorrected for more than 72 hours. Any ordinance that is imposed would be established after a water shortage emergency has been declared.

Drought Planning

This section describes the stages pertaining to actions that will be implemented in the event of a water supply shortage.

Water-Year Types

CWC Section 10632(i) requires the reliability of the water supply as well as its vulnerability to seasonal or climatic shortages to be described for each of the following water-year types:

- **Average water year**: A year in the historical sequence that most closely represents median runoff levels and patterns. It is defined as the median runoff over the previous 30 years or more. This median is recalculated every 10 years.
- **Single dry water year**: Generally considered to be the lowest annual runoff for a watershed since the water year beginning in 1903. Suppliers should determine this for each watershed from which they receive supplies.
- **Multiple dry water years**: Generally considered to be the lowest average runoff for a consecutive multiple-year period (i.e., 3 years or more) for a watershed since 1903. For example, 1928–1934 and 1987–1992 were the two multi-year periods of lowest average runoff during the 20th century in the Central Valley. Suppliers should determine this for each watershed from which they receive supplies.

The City has never had a single year or multiple dry years in which it did not pump 100% of its demand, regardless of regional hydrology. No reductions from normal-year supply are expected during single or multiple dry years. Therefore, a calculation to incorporate base years was not performed. However, appropriate base years for the City would be the same as they are for CCWD. These years are 1980 as an average year, 1961 as a single dry year, and 1989 to 1991 as multiple dry years. The basis for water-year data is shown in Table 6-8.

Table 6-8 (DWR Table 27). Basis for Water-Year Data

Table 27 Basis for Water-Year Data	
Water-Year Type	**Base Year(s)**
Average Water Year	1980
Single-Dry Water Year	1961
Multiple-Dry Water Years	1989–1991

Table 6-9 summarizes historic water supply reliability for normal, single, and multiple dry water years. In each case, the total available volume was the sum of the existing capacity of all water supplies.

Table 6-9 (DWR Table 28). Supply Reliability (historic conditions)[1]

Table 28 Supply Reliability (historic conditions)[1]					
	Single Dry Water Year	Multiple Dry Water Years			
		Year 1	Year 2	Year 3	Year 4
Average/Normal Water Year	16,010	16,010	16,010	16,010	16,010
Percent of Average/Normal Year	100%	100%	100%	100%	100%
Units: million gallons per year [1] Supply reliability in table includes both surface and groundwater sources.					

Stages of Action for Water Supply Shortages

In accordance with CWC Section 10632(a), the City has developed four stages of action to be taken in response to water supply shortages, including a reduction in water supply by up to 50%. Specific water supply conditions are applicable to each stage. A stage of action will be implemented during water supply shortages according to shortage level, ranging from a 5% shortage (i.e., Stage I) to a 50% shortage (i.e., Stage IV). The stage determination and declaration during a water supply shortage will be made by the public works director. Table 6-10 describes the water supply shortage levels and stages.

Table 6-10 (DWR Table 35). Water Shortage Contingency—Rationing Stages to Address Water Supply Shortages

Table 35 Water Shortage Contingency (rationing stages to address water supply shortages)		
Stage No.	**Water Supply Conditions**	**Shortage**
I	Minor Drought	5%–10%
II	Moderate Drought	10%–20%
III	Severe Drought	20%–35%
IV	Critical Drought	35%–50%

Stage I

During Stage I, water alert conditions are declared and voluntary water conservation is encouraged. The City has an ongoing public information campaign that relies on the distribution of literature, speaking engagements, bill inserts, and conservation messages in local newspapers and on the City's Water Conservation web page. The drought situation is explained to public and government bodies through these information campaigns. In addition, the City explains other stages, forecasts future actions, and requests voluntary water conservation. Educational programs in area schools are ongoing.

Stage II

During Stage II of a water supply shortage, the shortage is moderate (10% to 20%). Conservation may be voluntary, consist of allotments, and/or include mandatory conservation rules. The level of action increases with the level of shortage. The City aggressively continues its public information and educational programs. The City asks for a 10% to 20% water use reduction, either voluntary or mandatory. If necessary, the City also supports the passage of drought ordinances.

Stage III

During Stage III of a water supply shortage, the shortage is considered severe (20% to 35%). Conservation consists of allotments and mandatory conservation rules. This phase becomes effective upon notification by the City that water usage is to be reduced by a mandatory percentage. The City adopts drought ordinances and implements mandatory reductions. Rate changes are implemented to penalize excess usage.

Under Stage III, water use restrictions are put into effect (e.g., restrictions pertaining to the number of daytime hours for watering, excessive watering that results in gutter flooding, hoses without shutoff devices, non-recycling fountains, and washing down sidewalks or patios). The City monitors production weekly for compliance with the necessary reductions. If a customer consistently abuses his or her water use, the City responds by installing a flow restrictor at the water meter.

Stage IV

During Stage IV of a water supply shortage, the shortage is critical (35% to 50%). Conservation consists of allotments and mandatory conservation rules. All steps taken in prior stages are intensified, and water deliveries are monitored daily for compliance with the necessary reductions.

Three-Year Minimum Water Supply

The UWMP Act requires the City to quantify the minimum water supply available for the next 3 years based on the driest 3-year historic sequence for the water supply. Based on historic groundwater and surface water agreements, the City's 3-year minimum supply, as shown in Table 6-11, will equal 100% of the average water-year supply for the next 3 years. Recycled water demand can produce approximately 93% of the WWTP capacity, which is 1,630 million gallons per year. Demand and supply for 2011–2013 includes water conservation measures.

Table 6-11 (DWR Table 31). Supply Reliability (current water sources)

Table 31 Supply Reliability (current water sources)				
Water Supply Sources[1]	Average/Normal Water-Year Supply[2]	Multiple Dry Water-Year Supply[2]		
		2011	2012	2013
ECCID (COBWTP and RBWTP)[2]	4,823	4,823	4,823	4,823
ECCID Raw Water	397	397	397	397
Supplier-Produced Groundwater	1,825	1, 825	1, 825	1, 825
Recycled Water (WWTP)	1,697	1,697	1,697	1,697
Percent of Normal Year	**100%**			

Units: million gallons per year.
[1] From DWR Table 16.
[2] See DWR Table 27 for basis of water-type years.

Mechanisms for Determining Actual Reductions

CWC Section 10632(i) requires the water supplier to develop a mechanism for determining actual reductions in water use in the course of carrying out the urban water supply shortage contingency analysis. Under average water-year supply conditions, water production figures are recorded daily within and monitored by the water production supervisor during normal water supply conditions. Totals are reported monthly and incorporated into water supply reports. The City maintains extensive water use records on individual customer accounts. Exceptionally high usage is identified at meter reading time by the City's electronic meter reading management system. These accounts are investigated for potential water loss or abuse problems. During all stages of water shortages, daily production figures are reported to, and monitored by, the water production supervisor daily.

Water Supplies and Demand Assessment

The comparison of current and projected water supply and demand demonstrates the ability of a supplier to accommodate a City's water demands during an average water year as well as those years with water shortages. Water supply is described in Chapter 5, and water demands are described in Chapter 4.

Tables 6-12 through 6-14 summarize the projected average water supply and projected average water demand. As shown in the tables, the supply is not reduced for the different dry water year types. This is because of the fact that in the past, even in drought years, the City has always maintained sufficient supplies to meet demands due to their ECCID pre-1914 water rights. The City also has additional groundwater supplies as a source of water supply reliability. Should future water supply conditions change, it is possible that demand will also be reduced due to excess water use fees and the City will manage the supply to meet necessary demands. .

Table 6-12 (DWR Table 32). Supply and Demand Comparison (average year)

Table 32 Supply and Demand Comparison (average year)					
	2015	2020	2025	2030	2035 (optional)
Supply Totals (from DWR Table 16)	8,781	9,623	15,602	15,625	15,647
Demand Totals (from DWR Table 11)	4,623	4,551	5,010	5,321	5,619
Difference	4,158	5,072	10,593	10,305	10,028
Difference as % of Supply	47.4%	52.7%	67.9%	65.9%	64.1%
Difference as % of Demand	90.0%	111.4%	211.4%	193.7%	178.5%
Units: million gallons per year.					

Table 6-13 (DWR Table 33). Supply and Demand Comparison (single dry year)

Table 33 Supply and Demand Comparison (single dry year)					
	2015	2020	2025	2030	2035 (optional)
Supply Totals[1,2]	8,781	9,623	15,602	15,625	15,647
Demand Totals[2,3,4]	4,623	4,551	5,010	5,321	5,619
Difference	4,158	5,072	10,593	10,305	10,028
Difference as % of Supply	47.4%	52.7%	67.9%	65.9%	64.1%
Difference as % of Demand	90.0%	111.4%	211.4%	193.7%	178.5%

Units: million gallons per year.

[1] Consider the same sources as in DWR Table 16. If new sources of water are planned, add a column to the table and specify the source, timing, and amount of water.

[2] Provide in the UWMP text that discusses how single-dry-year water supply volumes were determined.

[3] Consider the same demands as in DWR Table 3. If new water demands are anticipated, add a column to the table and specify the source, timing, and amount of water.

[4] The urban water target determined in this UWMP will be considered when developing the 2020 water demands included in this table.

Table 6-14 (DWR Table 34). Supply and Demand Comparison (multiple dry-year events)

Table 34 Supply and Demand Comparison (multiple dry-year events)						
Multiple-Dry Year		**2015**	**2020**	**2025**	**2030**	**2035 (optional)**
First-Year Supply	Supply Totals[1,2]	8,781	9,623	15,602	15,625	15,647
	Demand Totals[2,3,4]	4,623	4,551	5,010	5,321	5,619
	Difference	4,158	5,072	10,593	10,305	10,028
	Difference as % of Supply	47.4%	52.7%	67.9%	65.9%	64.1%
	Difference as % of Demand	90.0%	111.4%	211.4%	193.7%	178.5%
Second-Year Supply	Supply Totals[1,2]	8,781	9,623	15,602	15,625	15,647
	Demand Totals[2,3,4]	4,623	4,551	5,010	5,321	5,619
	Difference	4,158	5,072	10,593	10,305	10,028
	Difference as % of Supply	47.4%	52.7%	67.9%	65.9%	64.1%
	Difference as % of Demand	90.0%	111.4%	211.4%	193.7%	178.5%
Third-Year Supply	Supply Totals[1,2]	8,781	9,623	15,602	15,625	15,647
	Demand Totals[2,3,4]	4,623	4,551	5,010	5,321	5,619
	Difference	4,158	5,072	10,593	10,305	10,028
	Difference as % of Supply	47.4%	52.7%	67.9%	65.9%	64.1%
	Difference as % of Demand	90.0%	111.4%	211.4%	193.7%	178.5%

Units are in acre-feet per year.

[1] Consider the same sources as in DWR Table 16. If new sources of water are planned, add a column to the table and specify the source, timing, and amount of water.

[2] Provide in the UWMP text that discusses how single-dry-year water supply volumes were determined.

[3] Consider the same demands as in DWR Table 3. If new water demands are anticipated, add a column to the table and specify the source, timing, and amount of water.

[4] The urban water target determined in this UWMP will be considered when developing the 2020 water demands included in this table.

Chapter 7
Demand Management Practices

Water conservation is a method available to reduce water demands, thereby reducing water supply needs for the City. This chapter describes the City's water conservation program, including water conservation demand management measures (DMMs). DMMs are specific actions a water supplier takes to support its water conservation efforts.

California Urban Water Conservation Council

The unpredictable water supply and ever increasing demand on California's complex water resources have resulted in a coordinated effort by DWR, water utilities, environmental organizations, and other interested groups to develop a list of 14 DMMs for conserving water, as identified in the UWMP Act (CWC Section 10631(f)). This consensus-building effort resulted in the Memorandum of Understanding (MOU) Regarding Urban Water Conservation in California, as amended September 16, 1999, among parties, which formalizes an agreement to implement these DMMs and makes a cooperative effort to reduce the consumption of California's water resources. The MOU is administered by the CUWCC. The City is currently an MOU signatory. The MOU requires a water utility to implement only the DMMs that are economically feasible. If a DMM is not economically feasible, the utility may request an economic exemption for that DMM. The DMMs in the MOU are generally recognized as standard definitions for water conservation measures. The 14 DMMs are as follows:

1. Water survey programs for single-family and multi-family residential connections.
2. Residential plumbing retrofit.
3. System water audits and leak detection and repair.
4. Metering with commodity rates for all new connections and retrofitting of existing connections.
5. Large landscape conservation programs and incentives.
6. High-efficiency washing machine rebate programs.
7. Public information programs.
8. School education programs.
9. Conservation programs for commercial, industrial, and institutional accounts.
10. Wholesale agency programs.
11. Conservation pricing.
12. Water conservation coordinator.
13. Water waste prohibition.
14. Residential ultra low-flow toilet replacement programs.

These 14 DMMs correspond to the 14 BMPs listed and described in the CUWCC MOU, which signatory water suppliers commit to as part of their urban water conservation programs. These 14

DMMs also correspond to the DMMs identified in Assembly Bill 1420, DMM Implementation Compliance. DWR has consulted with the CUWCC and appropriate funding agencies and determined that DMMs will be equated with the BMPs described in the CUWCC MOU for loan and grant funding eligibility purposes. Therefore, for the UWMP process, DMMs and BMPs will be referred to interchangeably as DMMs/BMPs. The CUWCC has reorganized its BMPs to group them according to type. Although BMP names and the overall organization have been modified, they still correlate to the DMMs identified in the UWMP Act.

Water Conservation Program

Water Conservation Program

The City conducts an ongoing water conservation program. A description of each DMM that is currently being implemented or scheduled for implementation, an implementation schedule, and a method to evaluate effectiveness is provided in this section. Several of these DMMs relate to the future water projects described in Chapter 5.

Table 8-1. Demand Management Measures Currently being Implemented or Scheduled for Implementation, Implementation Schedule, and Method to Evaluate Effectiveness

DMM 1	Water survey programs for single-family and multi-family residential connections
Year Implemented	**2005**
Description	The City conducts residential water use surveys as a free service to assist residents of single-family and multi-family units with identifying possible areas of water waste inside and outside their homes and educate them about water conservation techniques. Residential water use surveys consist of annual water audits, water use reviews, and surveys of past program participants. Audits are conducted by trained auditors and may include low-flow device installation. Auditors will identify water use problems, recommend repairs, and offer instruction regarding landscape principles, irrigation timer use, and, when appropriate, meter reading. To provide further program incentives, the City is offering a free 1.5-gallon-per-minute showerhead for scheduling a residential water use survey.
Implementation Steps	• City staff reviews online request forms submitted by residents and schedules a survey. • Survey is conducted by the City. • Survey results are entered into a database and provided to customers via mail.
Implementation Schedule	Ongoing. The City conducts such surveys annually upon request.
Evaluation of DMM Effectiveness	The effectiveness of this DMM will be evaluated by analyzing program penetration and comparing an audited customer's prior water use with future water use.
Conservation Savings and Effects on Future Reductions	A 10% water use reduction per household has been recorded as a result of these surveys. Future surveys will result in a water use reduction in the single-family and multi-family residential sectors.

DMM 2	Residential plumbing retrofit
Year Implemented	**2010**
Description	Plumbing retrofits at existing residential accounts consists of providing low-flow (1.5-gallon-per-minute) showerheads, faucet aerators, and toilet leak-detection tablets to customers. Because more than 75% of construction in the City occurred after 1992, most plumbing fixtures are ultra low-flow units. Remodeling and equipment replacement will upgrade older installations.
Implementation Steps	• As mentioned in DMM 1, the City offers a free 1.5-gallon-per-minute showerhead for scheduling a residential water use survey.
Implementation Schedule	The City provides a free low-flow showerhead to residents during a scheduled residential water use survey.
Evaluation of DMM Effectiveness	The effectiveness of this DMM will be evaluated by taking into consideration the number of customers who install low-flow showerheads and comparing an audited customer's prior water use with future water use.
Conservation Savings and Effects on Future Reductions	This DMM will result in a water use reduction in the single-family and multi-family residential sectors in the future. Savings resulting from this DMM may be linked to savings resulting from DMM 1.

DMM 3	System water audits and leak detection and repair
Year Implemented	**2005**
Description	A system water audit and leak detection and repair program consists of ongoing leak detection and repair within the water distribution system, with a focus on the high-probability leak areas. This program will also include an ongoing meter calibration and replacement program for all production and distribution meters. The existing Downtown Infrastructure project in the Future Water Projects section of Chapter 5 is an example of a project under this DMM.
Implementation Steps	• This DMM involves several different projects. All water audit information is maintained.
Implementation Schedule	The City conducts this program annually.
Evaluation of DMM Effectiveness	The effectiveness of this DMM will be evaluated by tracking leak detection and repair and comparing prior water use with future water use.
Conservation Savings and Effects on Future Reductions	Future savings from this DMM are expected to be 2% to 5% of total water use. Reductions will be reflected in the "other" water use sector volumes because that sector includes system losses.

DMM 4	Metering with commodity rates for all new connections and retrofitting of existing connections
Year Implemented	**2012**
Description	City meters serve both residential and non-residential connections. Currently, data are collected monthly using an automated meter reading system. The City plans to upgrade the existing Sensus automated meter reading system to an automated meter reading/advanced metering infrastructure fixed-base system. The new system will allow meter data to be recorded on an hourly basis. This will reduce water loss within the City because it will notify the staff of leaks, high consumption, and water theft when they occur and improve the effectiveness of the High-Usage Notification Program (DMM 11). See Sensus Automated Meter Reading System Upgrade in Chapter 5 for more detail.
Implementation Steps	• This is a multi-phase project. The first phase will evaluate system and communications requirements. The second phase will consist of upgrading the water meters (citywide) one zone at a time. The project should be completed within 4 years.
Implementation Schedule	To be completed by 2016.

DMM 4	Metering with commodity rates for all new connections and retrofitting of existing connections
Evaluation of DMM Effectiveness	The effectiveness of this DMM will be evaluated by comparing prior water use with future water use.
Conservation Savings and Effects on Future Reductions	This DMM could result in savings in all water use sectors because it is a programmatic system-wide upgrade.

DMM 5	Large landscape conservation programs and incentives
Year Implemented	**2008**
Description	Weather-Based Irrigation Controller Pilot Study: The irrigation controller assesses weather conditions and automatically adjusts the schedule to irrigate landscaping as needed. In an effort to reduce peak water usage, the City is conducting a pilot study to determine if weather-based irrigation controllers can effectively reduce irrigation water usage. The City is installing weather-based irrigation controllers for eligible residents who commit to participate in the pilot study for a minimum of 1 year. Weather-Based Irrigation Clocks: The City plans to provide financial incentives, such as rebates or replacement programs, to lower irrigation water use by offering rebates or replacement programs for SMART irrigation clocks that water based by management soil evapotranspiration, so fields are watered only when they need it. The City has applied for a regional grant with other water providers that could help fund this program. SMART irrigation clocks promote efficient irrigation water use and thus will reduce overall water use volumes.
Implementation Steps	• Identify all irrigation accounts as well as commercial, industrial, and institutional accounts with 1 acre or more of landscaping and record this information into a database. • Prepare irrigation educational information for all customers. • Review applications for pilot study participants. • Perform surveys with City staff or contractors.
Implementation Schedule	The pilot study is ongoing for those who want to participate.
Evaluation of DMM Effectiveness	Based on the City's study, annual water use was reduced by more than 20% at the homes tested. The effectiveness of this DMM will be evaluated by comparing prior water use with future water use of customers with large areas of landscaping.
Conservation Savings and Effects on Future Reductions	Annual residential landscape water use has already been reduced since the inception of the pilot study, and further reductions are expected as more weather-based irrigation controllers are installed.

DMM 6	High-efficiency washing machine rebate programs
Year Implemented	**2006**
Description	In collaboration with Pacific Gas and Electric, the City committed to a high-efficiency washing machine rebate program to promote this water-saving technology. The City offered washing machine rebates for four years utilizing several grants until the grant funds were depleted.
Implementation Steps	• Joined Pacific Gas and Electric's high-efficiency washing machine rebate program as a participating water agency.
Implementation Schedule	This program ended in January 2010, but the City may implement it again in the future. The City is also coordinating with other local agencies to obtain grant money for this program.
Evaluation of DMM Effectiveness	The effectiveness of this DMM was evaluated by analyzing program penetration and the estimated savings from high-efficiency washing machines. The City supported over 500 high-efficiency washing machine rebates during this four year period.
Conservation Savings and Effects on Future Reductions	This DMM would result in water use reductions primarily in the residential and commercial sectors if implemented in the future.

DMM 7	Public information programs
Year Implemented	**2005**
Description	Public information is an ongoing component of the City's water conservation program. The City currently produces bill inserts and news articles in the City's quarterly newsletter. The City plans to expand its web site to include conservation information. Water-Wise Landscape Information: This is an informational program available on a CCWD web site called Gardening in Contra Costa County (http://www.contracosta.watersavingplants.com/). The web site provides watering tips and information regarding irrigation schedules by soil type, water-saving plants, and other garden resources.
Implementation Steps	• Continually update customers on water conservation program activities and information via the City web site, newsletters, brochures, and other forms of media.
Implementation Schedule	The City's public information program is an ongoing annual program.
Evaluation of DMM Effectiveness	Savings from this program cannot be directly quantified.
Conservation Savings and Effects on Future Reductions	Future savings from this program cannot be directly quantified, but it would likely be reflected in total annual water use volumes.

DMM 8	School education programs
Year Implemented	**2005**
Description	School education is an ongoing component of the City's water conservation program. The program targets all grades, and includes offering Project WET workshops for teachers, performing classroom demonstrations, displaying booths at science fairs, providing assemblies. The City also promotes student participation, such as providing bus transportation for 4th graders, in the annual Public Works Open House.
Implementation Steps	• This is part of the City's public information program.
Implementation Schedule	The City's school education program is an ongoing annual program.
Evaluation of DMM Effectiveness	Savings from this program cannot be directly quantified.
Conservation Savings and Effects on Future Reductions	Future savings from this program cannot be directly quantified but would most likely be reflected in the commercial water use sector because it includes institutional and government water use.

DMM 9	Conservation programs for commercial, industrial, and institutional accounts
Year Implemented	**Projected 2014**
Description	The City will develop a conservation program for commercial, industrial, and institutional accounts that includes water audits targeted to the top water users. This program will also include surveys of past program participants to determine if audit recommendations were implemented.
Implementation Steps	• This will be an annual program in which the City will evaluate water use among individual commercial, industrial, and institutional accounts and determine which customers to target for water audits.
Implementation Schedule	Within 3 years, the City will commence this annual program.
Evaluation of DMM Effectiveness	The effectiveness of this DMM will be evaluated by analyzing the number of water audits done each year and comparing the prior water use of commercial, industrial, and institutional accounts with future water use.
Conservation Savings and Effects on Future Reductions	Future savings from this DMM will likely result in incremental decreases in water use in the commercial water use sector.

DMM 10	Wholesale agency programs
Year Implemented	
Description	This DMM is not applicable to the City because the City is not a wholesale agency.
Implementation Steps	
Implementation Schedule	
Evaluation of DMM Effectiveness	
Conservation Savings and Effects on Future Reductions	

DMM 11	Conservation pricing
Year Implemented	
Description	The City currently implements conservation pricing for all its metered customers. All of the City's customers are metered. Tiered rates are implemented for residential and commercial customers. High-Usage Notification Program: A notification program has been developed to identify homes that appear to use an above-average amount of water when compared with homes and lots of a similar size. If a resident's water usage is three times greater than the comparative average, a notification is sent to the resident, along with an invitation for a free residential water use survey. New meters (DMM 4) will help the City notify residents sooner about tier exceedances.
Implementation Steps	• The City's Water Conservation staff implements this program each quarter.
Implementation Schedule	The implementation of this DMM is ongoing.
Evaluation of DMM Effectiveness	The effectiveness of this DMM is evaluated according to the percentage and type of customers typically presented in the City's annual rate studies in each tier. Nearly half of all residential bills were at the Tier 1 rate of $2.50 per 1,000 gallons, the lowest variable consumption rate. However, non-residential usage figures show that the majority of the water sold is billed at the higher Tier 2 rate.
Conservation Savings and Effects on Future Reductions	Future savings from this DMM are likely to be consistent with the change in tier rates each year. If no rate change occurs, the changes are not anticipated to be notable.

DMM 12	Water conservation coordinator
Year Implemented	**2005**
Description	The City has hired a conservation coordinator as an ongoing component of the City's water conservation program. The conservation coordinator is responsible for implementing and monitoring the City's water conservation activities.
Implementation Steps	• The City water conservation coordinator continually works with other staff and stakeholders to implement activities in the water conservation program.
Implementation Schedule	The implementation of this DMM is ongoing.
Evaluation of DMM Effectiveness	Water savings from this DMM cannot be directly quantified. Effectiveness of this DMM will be evaluated by the success of the City's water conservation program.
Conservation Savings and Effects on Future Reductions	Future savings as a result of this DMM will be difficult to quantify, but an overall reduction in annual water use will reflect the success of this program.

DMM 13a	Water waste prohibition
Year Implemented	**2010**
Description	Model Water-Efficient Landscape Ordinance: According to the Water Conservation in Landscaping Act of 2006 (Assembly Bill 1881 [Laird]) the City adopted the State's Model Water-Efficient Landscape Ordinance on January 1, 2010 (Appendix D). This ordinance requires a landscape permit, plan check, or design review for new and rehabilitated landscaped areas of 2,500 square feet or greater. The City has been working to rewrite Municipal Code 17.630 (Landscaping and Screening ordinance adopted in 1992). This rewrite is scheduled to go to Council on June 14, 2011.
Implementation Steps	• The City will review landscape permit applications and grant permits.
Implementation Schedule	The implementation of this DMM is ongoing.
Evaluation of DMM Effectiveness	Water savings from this program cannot be directly quantified.
Conservation Savings and Effects on Future Reductions	Future water savings from this DMM will likely be reflected in the landscape water use sector.

DMM 14	Residential ultra low-flow toilet replacement programs
Year Implemented	**2008**
Description	The City is currently offering $50 rebates for high-efficiency toilets (HETs), which are even more efficient than ultra low-flow toilets (ULFTs). The rebates apply to customers who fill out a rebate application form and have bought and installed eligible toilets (1.28 gallons per flush or less). Approved toilets must be purchased on or after July 1, 2010. Applications will be processed until funds are depleted. High-Efficiency Toilets (HETs) are defined as fixtures that flush at 20 percent below the 1.6-gallons-per-flush (gpf) The average water savings for HETs is estimated to be 38 gallons per day (gpd) when replacing a non-ULFT. More than 75% of construction in the City occurred after 1992, and the City estimates that more than 90% of toilets are already ULFT units. HETs are even more efficient than ULFTs, and thus can replace ULFTs as well as Non-ULFTs. The average water savings for HETs is estimated to be 7 gpd when replacing a ULFT.
Implementation Steps	• The City produced a HET Rebate Program Terms and Conditions for Participation brochure and rebate application form for customers to apply for a rebate. The City reviews applications and may conduct a HET inspection at the household for verification. Rebates are entered in a database and are limited to one per household.
Implementation Schedule	Not applicable. The City is not currently implementing this DMM.
Evaluation of DMM Effectiveness	The effectiveness of this DMM was evaluated by analyzing program penetration and the estimated savings from HETs.
Conservation Savings and Effects on Future Reductions	This DMM will result in water use reductions primarily in the residential sector if implemented in the future.

Economic Analysis

Methodology and Assumptions

As noted above, the City already has implemented or plans to implement most DMMs. Owing to existing high market penetration for the other DMMs (2 and 14), no economic analyses were completed in the preparation of this plan.

Results

As noted above, no economic analyses were completed for this plan. Hence, this section is not applicable.

California Urban Water Conservation Council | cuwcc.org | MOU Coverage Report 2009-2010

CUWCC BMP RETAIL COVERAGE REPORT 2009-2010

Foundation Best Management Practices for Urban Water Efficiency

Agency: City of Brentwood **District Name:** City of Brentwood **CUWCC Unit #:** 47
Retail

Primary Contact Diana Williford **Telephone** (925) 516-6045 **Email:** dwilliford@ci.brentwood.ca.us

Compliance Option Chosen By Reporting Agency:
(Traditional, Flex Track or GPCD)
GPCD if used:

GPCD in 2010	199
GPCD Target for 2018	189

Year	Report	Target		Highest Acceptable Bound	
		% Base	GPCD	% Base	GPCD
2010	1	96.4%	222	100%	231
2012	2	92.8%	214	96%	222
2014	3	89.2%	206	93%	214
2016	4	85.6%	198	89%	206
2018	5	82.0%	189	82%	189

Not on Track if 2010 GPCD is ≥ than target

GPCD in 2010	199
Highest Acceptable GPCD for 2010	231

On Track

Reporting Period: Calendar

California Urban Water Conservation Council | cuwcc.org | MOU Coverage Report 2009-2010

Agency: City of Brentwood **District Name:** City of Brentwood **CUWCC Unit #:** 47
Retail

CUWCC BMP RETAIL COVERAGE REPORT 2009-2010

Foundation Best Management Practices for Urban Water Efficiency

BMP 1.1 Operational Practices

		2009	2010
1.Conservation Coordinator	Name	Diana Williford	Diana Williford
	Title	Water Conservation Specialist	Water Conservation Specialist
	Email		dwilliford@ci.brentw
		On Track	On Track
2. Water waste prevention documentation			
	Descriptive File	0	0
	URL	The City of Brentwood adopted the DWR updated MWELO effective January 1, 2010. The City then began to rewrite it's existing Landscaping regulations. On January 21, 2010 the Planning Commission of the City of Brentwood adopted a rezone to amend Chapter 17.	www.ci.brentwood.ca.us
	Description	The City of Brentwood adopted the DWR updated MWELO effective January 1, 2010. The City then began to rewrite it's existing Landscaping regulations. On January 21, 2010 the Planning Commission of the City of Brentwood adopted a rezone to amend Chapter 17.	The City of Brentwood adopted the DWR updated MWELO effective January 1, 2010. The City then began to rewrite it's existing Landscaping regulations. On January 21, 2010 the Planning Commission of the City of Brentwood adopted a rezone to amend Chapter 17.
		On Track	On Track

California Urban Water Conservation Council | cuwcc.org | MOU Coverage Report 2009-2010

Agency: City of Brentwood **District Name:** City of Brentwood **CUWCC Unit #:** 47
Retail

CUWCC BMP RETAIL COVERAGE REPORT 2009-2010

Foundation Best Management Practices for Urban Water Efficiency

BMP 1.2 Water Loss Control

	2009		
Complete a prescreening Audit	yes	On Track	On Track if Yes
Metered Sales	10,398		
Verifiable Other Uses	10,551		
Total Supply	11,453		
(Metered Sales + System uses)/ Total Supply >0.89	1.83	On Track	On Track if =>.89, Not on Track if No
If ratio is less than 0.9, complete a full scale Audit in 2009?	Yes	On Track	On Track if Yes
Verify Data with Records on File?	Yes	On Track	On Track if Yes
Operate a system Leak Detection Program?	Yes	On Track	On Track if Yes

	2010		
Compile Standard Water Audit using AWWA Software?	Yes	On Track	On Track if Yes, Not on Track if No
AWWA file provided to CUWCC?	2010CityofBrentwoodWa	On Track	On Track if Yes, Not on Track if No
AWWA Water Audit Validity Score?	80		Info only until 2012
Completed Training in AWWA Audit Method?	yes		Info only until 2012
Completed Training in Component Analysis Process?	No		
Complete Component Analysis?	Off		Info only until 2012
Repaired all leaks and breaks to the extent cost effective?	Yes	On Track	On Track if Yes, Not on Track if No
Locate and repair unreported leaks to the extent cost effective.	Yes	On Track	On Track if Yes, Not on Track if No
Maintain a record-keeping system for the repair of reported leaks, including time of report, leak location, type of leaking pipe segment or fitting, and leak running time from report to repair.			Info only until 2012

Provided 7 types of Water Loss Control Info — Info only until 2012

Leaks Repaired	Value Real Losses	Value Apparent Losses	Miles Surveyed	Press Reduction	Cost of Interventions	Water Saved
80	$ -	$ 135,700	1.5	Off	$ -	0

California Urban Water Conservation Council | cuwcc.org | MOU Coverage Report 2009-2010

Agency: City of Brentwood | District Name: City of Brentwood | CUWCC Unit #: 47

Retail

CUWCC BMP RETAIL COVERAGE REPORT 2009-2010

Foundation Best Management Practices for Urban Water Efficiency

1.3 METERING WITH COMMODITY RATES FOR ALL NEW CONNECTIONS AND RETROFIT OF EXISTING CONNECTIONS

If signed MOU prior to 31 Dec 1997, On Track if all connections metered; if signed after 31 Dec 1997, complete meter installations by 1 July 2012 or within 6 yrs of signing and 20% biannual reduction of unmetered connections.

	2009		2010		
Exemption or 'At least as Effective As' accepted by CUWCC					
Numbered Unmetered Accounts 2008	0	On Track	0	On Track	On Track if no unmetered accounts
Metered Accounts billed by volume of use	Yes	On Track	Yes	On Track	Volumetric billing required for all connections on same schedule as metering
Number of CII accounts with Mixed Use meters	0		0		Info only
Conducted a feasibility study to assess merits of a program to provide incentives to switch mixed-use accounts to dedicated landscape meters?	No		No		Info Only
Feasibility Study provided to CUWCC?	Yes	On Track	No	On Track	On Track if Yes, Not on Track if No
Completed a written plan, policy or program to test, repair and replace meters	Yes	On Track	Yes	On Track	On Track if Yes, Not on Track if No

CUWCC BMP RETAIL COVERAGE REPORT 2009-2010

Foundation Best Management Practices for Urban Water Efficiency

Agency: City of Brentwood **District Name:** City of Brentwood **CUWCC Unit #:** 47

Retail

Primary Contact Diana Williford **Email:** dwilliford@ci.brentwood.ca.us

On Track if: Increasing Block, Uniform, Allocation, Standby Service; Not on Track if otherwise

1.4 Retail Conservation Pricing

Metered Water Rate Structure

Customer Class	2009 Rate Type	Conserving Rate?	Customer Class	2010 Rate Type	Conserving Rate?
Single-Family	Increasing Block	Yes	Single-Family	Increasing Block	Yes
Multi-Family	Increasing Block	Yes	Multi-Family	Increasing Block	Yes
Commercial	Increasing Block	Yes	Commercial	Increasing Block	Yes
Dedicated Irrigation	Increasing Block	Yes	Dedicated Irrigation	Increasing Block Seasonal	Yes
Other	Uniform	Yes	Other	Increasing Block Seasonal	Yes
	On Track			On Track	

Year Volumetric Rates began for Agencies with some Unmetered Accounts

Info only

Agencies with Partially Metered Service Areas: If signed MOU prior to 31 Dec. 1997, implementation starts no later than 1July 2010. If signed MOU after 31 Dec. 1997, implementation starts no later than 1July 2013, or within seven years of signing the MOU,

Agency: Retail **City of Brentwood** District Name: **City of Brentwood** CUWCC Unit #: **47**

CUWCC BMP RETAIL COVERAGE REPORT 2009-2010

Foundation Best Management Practices for Urban Water Efficiency

Adequacy of Volumetric Rates) for Agencies with No Unmetered Accounts

Customer Class	2009 Rate Type	2009 Volumetric Revenues $1000s	2010 Rate Type	2010 Volumetric Revenues $1000s
Single-Family	Increasing Block	$ 7,487	Single-Family	$ 7,019
Multi-Family		$ 285		$ 279
Commercial		$ 560		$ 536
Dedicated Irrigation		$ 970		$ 1,035
Other		$ 93		$ 430
Other		$ -		$ -
Other		$ -		$ -
Total Revenue Commodity Charges (V):		$ 9,394		$ 9,300
Total Revenue Fixed Charges (M):		$ 4,418		$ 5,134
Calculate: V / (V + M):		68%		64%
		On Track		On Track

Agency Choices for rates:

A) Agencies signing MOU prior to 13 June2007, implementation starts 1 July2007: On Track if (V / (V + M) ≥ 70% x .8 = **56% for 2009** and 70%x0.90 = **63% for 2010**; Not on track if (V / (V + M)) < 70%;

B) Use Canadian model.

Agencies signing MOU after 13June2007, implementation starts July 1 of year following signing.

	2009	2010
Canadian Water & Wastewater Rate Design Model Used and Provided to CUWCC	No	No
If Canadian Model is used, was 1 year or 3 year period applied?		

Agency: City of Brentwood
Retail

District Name: City of Brentwood

CUWCC Unit #: 47

CUWCC BMP RETAIL COVERAGE REPORT 2009-2010

Foundation Best Management Practices for Urban Water Efficiency

Wastewater Rates

Does Agency Provide Sewer Service? 2009: yes — If 'No', then wastewater rate info not required. 2010: Yes

Customer Class	2009 Rate Type	Conserving Rate?	Customer Class	2010 Rate Type	Conserving Rate?
Single-Family	Increasing Block	Yes	Other	Increasing Block	Yes
Multi-Family	Increasing Block	Yes			
Commercial	Increasing Block Seasonal	Yes			
Industrial	Increasing Block Seasonal	Yes			
Other	Increasing Block Seasonal	yes			
	On Track			On Track	

On Track if: 'Increasing Block', 'Uniform', 'based on long term marginal cost' or 'next unit of capacity'

California Urban Water Conservation Council | cuwcc.org | MOU Coverage Report 2009-2010

CUWCC BMP RETAIL COVERAGE REPORT 2009-2010

Foundation Best Management Practices for Urban Water Efficiency

Agency: City of Brentwood **District Name:** City of Brentwood **CUWCC Unit #:** 47

Coverage Report Date: May 19, 2011

Primary Contact Diana Williford **Telephone** #N/A **Email:** dwilliford@ci.brentwood.ca.us

BMP 2. EDUCATION PROGRAMS

BMP 2.1 Public Outreach Actions Implemented and Reported to CUWCC

	2009	2010	
1) Contacts with the public (minimum = 4 times per year)	314,894	72,000	
2) Water supplier contacts with media (minimum = 4 times per year, i.e., at least quarterly).	314,894	72,000	
3) An actively maintained website that is updated regularly (minimum = 4 times per year, i.e., at least quarterly).	Yes	yes	All 6 action types implemented and reported to CUWCC to be 'On Track')
4) Description of materials used to meet minimum requirement.	Website Newsletter articles on conservation Flyers brochures Newsletter articles on conservation	Website Newsletter articles on conservation Newsletter articles on conservation	
5) Annual budget for public outreach program.	$ 308,292	$ 453,206	
6) Description of all other outreach programs	Description is too large for text area. Data will be stored in the BMP Reporting database when online.	Description is too large for text area. Data will be stored in the BMP Reporting database when online.	
	OnTrackfor 6 Actions	OnTrack for 6 Actions	

California Urban Water Conservation Council | cuwcc.org | MOU Coverage Report 2009-2010

Agency: City of Brentwood | **District Name:** City of Brentwood | **CUWCC Unit #:** 47 | Coverage Report Date: May 19, 2011

CUWCC BMP RETAIL COVERAGE REPORT 2009-2010

Foundation Best Management Practices for Urban Water Efficiency

2.2 School Education Programs Implemented and Reported to CUWCC

	2009	2010	
Does a wholesale agency implement School Education Programs for this unility's benefit?	No	No	
Name of Wholesale Supplier?	0	0	
1) Curriculum materials developed and/or provided by agency	Project WET	Project WET	Yes/ No
2) Materials meet state education framework requirements and are grade-level appropriate?	Yes	Yes	All 5 actions types implemented and reported to CUWCC to be 'On Track'
3) Materials Distributed to K-6?	yes	Yes	
Describe K-6 Materials	AWWA publication titled "Water Adventures Around the World"		Describe materials to meet minimum requirements
Materials distributed to 7-12 students?	No	No	Info Only
4) Annual budget for school education program.	$ 4,300	$ 10,750	
5) Description of all other water supplier education programs		The City offers annual educational assemblies to grades K-8. EarthCapades Environmental Vaudeville provides information regarding water conservation and recycling.	
	1 On Track	1 On Track	

Chapter 8
References

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Appendix A

California Urban Water Management Plan Act

Established: AB 797, Klehs, 1983
Amended: AB 2661, Klehs, 1990
AB 11X, Filante, 1991
AB 1869, Speier, 1991
AB 892, Frazee, 1993
SB 1017, McCorquodale, 1994
AB 2853, Cortese, 1994
AB 1845, Cortese, 1995
SB 1011, Polanco, 1995
AB 2552, Bates, 2000
SB 553, Kelley, 2000
SB 610, Costa, 2001
AB 901, Daucher, 2001
SB 672, Machado, 2001
SB 1348, Brulte, 2002
SB 1384, Costa, 2002
SB 1518, Torlakson, 2002
AB 105, Wiggins, 2004
SB 318, Alpert, 2004
SB 1087, Florez, 2005
SBX7 7, Steinberg, 2009

CALIFORNIA WATER CODE DIVISION 6
PART 2.6. URBAN WATER MANAGEMENT PLANNING

CHAPTER 1. GENERAL DECLARATION AND POLICY

10610. This part shall be known and may be cited as the "Urban Water Management Planning Act."

10610.2. (a) The Legislature finds and declares all of the following:

(1) The waters of the state are a limited and renewable resource subject to ever-increasing demands.

(2) The conservation and efficient use of urban water supplies are of statewide concern; however, the planning for that use and the implementation of those plans can best be accomplished at the local level.

(3) A long-term, reliable supply of water is essential to protect the productivity of California's businesses and economic climate.

(4) As part of its long-range planning activities, every urban water supplier should make every effort to ensure the appropriate level of reliability in its water service sufficient to meet the needs of its various categories of customers during normal, dry, and multiple dry water years.

(5) Public health issues have been raised over a number of contaminants that have been identified in certain local and imported water supplies.

(6) Implementing effective water management strategies, including groundwater storage projects and recycled water projects, may require specific water quality and salinity targets for meeting groundwater basins water quality objectives and promoting beneficial use of recycled water.

(7) Water quality regulations are becoming an increasingly important factor in water agencies' selection of raw water sources, treatment alternatives, and modifications to existing treatment facilities.

(8) Changes in drinking water quality standards may also impact the usefulness of water supplies and may ultimately impact supply reliability.

(9) The quality of source supplies can have a significant impact on water management strategies and supply reliability.

(b) This part is intended to provide assistance to water agencies in carrying out their long-term resource planning responsibilities to ensure adequate water supplies to meet existing and future demands for water.

10610.4. The Legislature finds and declares that it is the policy of the state as follows:

(a) The management of urban water demands and efficient use of water shall be actively pursued to protect both the people of the state and their water resources.

(b) The management of urban water demands and efficient use of urban water supplies shall be a guiding criterion in public decisions.

(c) Urban water suppliers shall be required to develop water management plans to actively pursue the efficient use of available supplies.

CHAPTER 2. DEFINITIONS

10611. Unless the context otherwise requires, the definitions of this chapter govern the construction of this part.

10611.5. "Demand management" means those water conservation measures, programs, and incentives that prevent the waste of water and promote the reasonable and efficient use and reuse of available supplies.

10612. "Customer" means a purchaser of water from a water supplier who uses the water for municipal purposes, including residential, commercial, governmental, and industrial uses.

10613. "Efficient use" means those management measures that result in the most effective use of water so as to prevent its waste or unreasonable use or unreasonable method of use.

10614. "Person" means any individual, firm, association, organization, partnership, business, trust, corporation, company, public agency, or any agency of such an entity.

10615. "Plan" means an urban water management plan prepared pursuant to this part. A plan shall describe and evaluate sources of supply, reasonable and practical efficient uses, reclamation and demand management activities. The components of the plan may vary according to an individual community or area's characteristics and its capabilities to efficiently use and conserve water. The plan shall address measures for residential, commercial, governmental, and industrial water demand management as set forth in Article 2 (commencing with Section 10630) of Chapter 3. In addition, a strategy and time schedule for implementation shall be included in the plan.

10616. "Public agency" means any board, commission, county, city and county, city, regional agency, district, or other public entity.

10616.5. "Recycled water" means the reclamation and reuse of wastewater for beneficial use.

10617. "Urban water supplier" means a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually. An urban water supplier includes a supplier or contractor for water, regardless of the basis of right, which distributes or sells for ultimate resale to customers. This part applies only to water supplied from public water systems subject to Chapter 4 (commencing with Section 116275) of Part 12 of Division 104 of the Health and Safety Code.

CHAPTER 3. URBAN WATER MANAGEMENT PLANS
Article 1. General Provisions

10620.

(a) Every urban water supplier shall prepare and adopt an urban water management plan in the manner set forth in Article 3 (commencing with Section 10640).

(b) Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.

(c) An urban water supplier indirectly providing water shall not include planning elements in its water management plan as provided in Article 2 (commencing with Section 10630) that would be applicable to urban water suppliers or public agencies directly providing water, or to their customers, without the consent of those suppliers or public agencies.

(d)

(1) An urban water supplier may satisfy the requirements of this part by participation in areawide, regional, watershed, or basinwide urban water management planning where those plans will reduce preparation costs and contribute to the achievement of conservation and efficient water use.

(2) Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.

(e) The urban water supplier may prepare the plan with its own staff, by contract, or in cooperation with other governmental agencies.

(f) An urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions.

10621.

(a) Each urban water supplier shall update its plan at least once every five years on or before December 31, in years ending in five and zero.

(b) Every urban water supplier required to prepare a plan pursuant to this part shall notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. The urban water supplier may consult with, and obtain comments from, any city or county that receives notice pursuant to this subdivision.

(c) The amendments to, or changes in, the plan shall be adopted and filed in the manner set forth in Article 3 (commencing with Section 10640).

Article 2. Contents of Plans

10630. It is the intention of the Legislature, in enacting this part, to permit levels of water management planning commensurate with the numbers of customers served and the volume of water supplied.

10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:

(a) Describe the service area of the supplier, including current and projected population, climate, and other demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.

(b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a). If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information shall be included in the plan:

(1) A copy of any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management.

(2) A description of any groundwater basin or basins from which the urban water supplier pumps groundwater. For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree.

For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition.

(3) A detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the

past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(c) Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following:

(1) An average water year.
(2) A single dry water year.
(3) Multiple dry water years.

For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.

(d) Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.

(e)

(1) Quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, identifying the uses among water use sectors including, but not necessarily limited to, all of the following uses:

(A) Single-family residential.
(B) Multifamily.
(C) Commercial.
(D) Industrial.
(E) Institutional and governmental.
(F) Landscape.
(G) Sales to other agencies.
(H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof.
(I) Agricultural.

(2) The water use projections shall be in the same five-year increments described in subdivision (a).

(f) Provide a description of the supplier's water demand management measures. This description shall include all of the following:

(1) A description of each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following:

(A) Water survey programs for single-family residential and multifamily residential customers.

(B) Residential plumbing retrofit.

(C) System water audits, leak detection, and repair.

(D) Metering with commodity rates for all new connections and retrofit of existing connections.

(E) Large landscape conservation programs and incentives.

(F) High-efficiency washing machine rebate programs.

(G) Public information programs.

(H) School education programs.

(I) Conservation programs for commercial, industrial, and institutional accounts.

(J) Wholesale agency programs.

(K) Conservation pricing.

(L) Water conservation coordinator.

(M) Water waste prohibition.

(N) Residential ultra-low-flush toilet replacement programs.

(2) A schedule of implementation for all water demand management measures proposed or described in the plan.

(3) A description of the methods, if any, that the supplier will use to evaluate the effectiveness of water demand management measures implemented or described under the plan.

(4) An estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of the savings on the supplier's ability to further reduce demand.

(g) An evaluation of each water demand management measure listed in paragraph (1) of subdivision (f) that is not currently being implemented or scheduled for implementation. In the course of the evaluation, first consideration shall be given to water demand management measures, or combination of measures, that offer lower incremental costs than expanded or additional water supplies. This evaluation shall do all of the following:

(1) Take into account economic and noneconomic factors, including environmental, social, health, customer impact, and technological factors.

(2) Include a cost-benefit analysis, identifying total benefits and total costs.

(3) Include a description of funding available to implement any planned water supply project that would provide water at a higher unit cost.

(4) Include a description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation.

(h) Include a description of all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs, other than the demand management programs identified pursuant to paragraph (1) of subdivision (f), that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in average, single-dry, and multiple-dry water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program.

(i) Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.

(j) Urban water suppliers that are members of the California Urban Water Conservation Council and submit annual reports to that council in accordance with the ‘‘Memorandum of Understanding Regarding Urban Water Conservation in California,’’ dated September 1991, may submit the annual reports identifying water demand management measures currently being implemented, or scheduled for implementation, to satisfy the requirements of subdivisions (f) and (g).

(k) Urban water suppliers that rely upon a wholesale agency for a source of water, shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five-year increments, and during various water-year types in accordance with subdivision (c). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (c), including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.

10631.5. The department shall take into consideration whether the urban water supplier is implementing or scheduled for implementation, the water demand management activities that the urban water supplier identified in its urban water management plan, pursuant to Section 10631, in evaluating applications for grants and loans made available pursuant to Section 79163. The urban water supplier may submit to the department copies of its annual reports and other relevant documents to assist the department in determining whether the urban water supplier is implementing or scheduling the implementation of water demand management activities.

10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier:

(a) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions which are applicable to each stage.

(b) An estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply.

(c) Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.

(d) Additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.

(e) Consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.

(f) Penalties or charges for excessive use, where applicable.

(g) An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.

(h) A draft water shortage contingency resolution or ordinance.

(i) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.

10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area, and shall include all of the following:

(a) A description of the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.

(b) A description of the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.

(c) A description of the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.

(d) A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.

(e) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision.

(f) A description of actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.

(g) A plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.

10634. The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631, and the manner in which water quality affects water management strategies and supply reliability.

Article 2.5 Water Service Reliability

10635.

(a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled

pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.

(b) The urban water supplier shall provide that portion of its urban water management plan prepared pursuant to this article to any city or county within which it provides water supplies no later than 60 days after the submission of its urban water management plan.

(c) Nothing in this article is intended to create a right or entitlement to water service or any specific level of water service.

(d) Nothing in this article is intended to change existing law concerning an urban water supplier's obligation to provide water service to its existing customers or to any potential future customers.

Articl 3. Adoption and Implementation of Plans

10640. Every urban water supplier required to prepare a plan pursuant to this part shall prepare its plan pursuant to Article 2 (commencing with Section 10630).

The supplier shall likewise periodically review the plan as required by Section 10621, and any amendments or changes required as a result of that review shall be adopted pursuant to this article.

10641. An urban water supplier required to prepare a plan may consult with, and obtain comments from, any public agency or state agency or any person who has special expertise with respect to water demand management methods and techniques.

10642. Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan. Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code. The urban water supplier shall provide notice of the time and place of hearing to any city or county within which the supplier provides water supplies. A privately owned water supplier shall provide an equivalent notice within its service area. After the hearing, the plan shall be adopted as prepared or as modified after the hearing.

10643. An urban water supplier shall implement its plan adopted pursuant to this chapter in accordance with the schedule set forth in its plan.

10644.

(a) An urban water supplier shall file with the department and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. Copies of amendments or changes to the plans shall be filed with the department and any city or county within which the supplier provides water supplies within 30 days after adoption.

(b) The department shall prepare and submit to the Legislature, on or before December 31, in the years ending in six and one, a report summarizing the status of the plans adopted pursuant to this part. The report prepared by the department shall identify the outstanding elements of the individual plans. The department shall provide a copy of the report to each urban water supplier that has filed its plan with the department. The department shall also prepare reports and provide data for any legislative hearings designed to consider the effectiveness of plans submitted pursuant to this part.

10645. Not later than 30 days after filing a copy of its plan with the department, the urban water supplier and the department shall make the plan available for public review during normal business hours.

CHAPTER 4. MISCELLANEOUS PROVISIONS

10650. Any actions or proceedings to attack, review, set aside, void, or annul the acts or decisions of an urban water supplier on the grounds of noncompliance with this part shall be commenced as follows:

(a) An action or proceeding alleging failure to adopt a plan shall be commenced within 18 months after that adoption is required by this part.

(b) Any action or proceeding alleging that a plan, or action taken pursuant to the plan, does not comply with this part shall be commenced within 90 days after filing of the plan or amendment thereto pursuant to Section 10644 or the taking of that action.

10651. In any action or proceeding to attack, review, set aside, void, or annul a plan, or an action taken pursuant to the plan by an urban water supplier on the grounds of noncompliance with this part, the inquiry shall extend only to whether there was a prejudicial abuse of discretion. Abuse of discretion is established if the supplier has not proceeded in a manner required by law or if the action by the water supplier is not supported by substantial evidence.

10652. The California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) does not apply to the preparation and adoption of plans pursuant to this part or to the implementation of actions taken pursuant to Section 10632. Nothing in this part shall be interpreted as exempting from the California Environmental Quality Act any project that would significantly affect water

supplies for fish and wildlife, or any project for implementation of the plan, other than projects implementing Section 10632, or any project for expanded or additional water supplies.

10653. The adoption of a plan shall satisfy any requirements of state law, regulation, or order, including those of the State Water Resources Control Board and the Public Utilities Commission, for the preparation of water management plans or conservation plans; provided, that if the State Water Resources Control Board or the Public Utilities Commission requires additional information concerning water conservation to implement its existing authority, nothing in this part shall be deemed to limit the board or the commission in obtaining that information. The requirements of this part shall be satisfied by any urban water demand management plan prepared to meet federal laws or regulations after the effective date of this part, and which substantially meets the requirements of this part, or by any existing urban water management plan which includes the contents of a plan required under this part.

10654. An urban water supplier may recover in its rates the costs incurred in preparing its plan and implementing the reasonable water conservation measures included in the plan. Any best water management practice that is included in the plan that is identified in the "Memorandum of Understanding Regarding Urban Water Conservation in California" is deemed to be reasonable for the purposes of this section.

10655. If any provision of this part or the application thereof to any person or circumstances is held invalid, that invalidity shall not affect other provisions or applications of this part which can be given effect without the invalid provision or application thereof, and to this end the provisions of this part are severable.

10656. An urban water supplier that does not prepare, adopt, and submit its urban water management plan to the department in accordance with this part, is ineligible to receive funding pursuant to Division 24 (commencing with Section 78500) or Division 26 (commencing with Section 79000), or receive drought assistance from the state until the urban water management plan is submitted pursuant to this article.

10657.

(a) The department shall take into consideration whether the urban water supplier has submitted an updated urban water management plan that is consistent with Section 10631, as amended by the act that adds this section, in determining whether the urban water supplier is eligible for funds made available pursuant to any program administered by the department.

(b) This section shall remain in effect only until January 1, 2006, and as of that date is repealed, unless a later enacted statute, that is enacted before January 1, 2006, deletes or extends that date.

Appendix B
Public Hearing Notices

BRENTWOOD PRESS & PUBLISHING CORPORATION

248 Oak Street, Brentwood, CA 94513
Phone: (925) 634-1441 Fax: (925) 634-1975

Classified Advertising Receipt

City of Brentwood - City Clerk
150 City Park Way
Brentwood, CA
94513

Cust# 133
Cust Tel# (925) 516-5440
Ad# 61082
Date: 11/13/13
Salesperson: Connie O'Neill
PO#:

Edition	Insertion Date	Amount
Brentwood Press	11/29/13	59.93
Brentwood Press	12/06/13	59.93
	Total:	119.86
	Grand Total	119.86

Ad Text

NOTICE OF PUBLIC HEARING Notice is hereby given that the City Council of the City of Brentwood will, at 7:00 p.m. or as soon thereafter as the normal course of business permits on December 10, 2013, hold a public hearing to consider the following: A Resolution adopting the Final 2010 Urban Water Management Plan as recommended by the California Department of Water Resources. Said hearing will be held at the City Council Chambers, 150 City Park Way, Brentwood, California, 94513. A copy of the plan is available for review at City Hall, 150 City Park Way, or online at http://www.brentwoodca.gov/pdf/newsletters/2010UWMP.pdf. Further information may be obtained from Water Conservation Specialist, Diana Williford, (925) 516-6045 or dwilliford@brentwoodca.gov, in the Public Works Operations Department of the City of Brentwood, 2201 Elkins Way, Brentwood, California 94513. In any court challenge of City Council decisions, you may be limited to raising only those issues you or someone else raised at the public hearing described in this notice, or in written correspondence delivered to the Brentwood City Council at, or prior to, the public hearing. CITY OF BRENTWOOD /s/ Margaret Wimberly, CMC, City Clerk Dated: November 13, 2013 Brentwood Press No: 02-1273/61082 Publish Dates: November 29, December 6, 2013.

Appendix B

Brentwood Press
248 Oak Street
Brentwood, CA 94513
Tel : (925) 634-1441

Classified Advertising Receipt

City of Brentwood - City Clerk
708 Third Street
Brentwood, CA
94513

Cust# 133
Cust Tel# (925) 516-5440
Ad# 47577
Date: 04/28/11
Classification: City Notices-Brentwood
Salesperson: Greg Robinson

Edition	Insertion Date	Amount
Brentwood Press	05/13/11	45.32
Brentwood Press	05/20/11	45.31
	Total:	90.63
		0.00
		0.00
	Grand Total	90.63

Ad Text

NOTICE OF PUBLIC HEARING Notice is hereby given that the City Council of the City of Brentwood will, at 7:00 p.m. or as soon thereafter as the normal course of business permits on May 24, 2011, hold a public hearing to consider the following: A Resolution of the City Council of the City of Brentwood approving the 2010 Urban Water Management Plan for submittal to the California Department of Water Resources as prepared by Staff and ICF Jones & Stokes International, Engineering Consultants. Said hearing will be held at the City Council Chambers, 101B Sand Creek Road, Brentwood, California, 94513. Further information may be obtained from Water Conservation Specialist Diana Williford [(925) 516-6045 or dwilliford@ci.brentwood.ca.us] in the Public Works Operations Department of the City of Brentwood, 2201 Elkins Way, Brentwood, California 94513. In any court challenge of City Council decisions, you may be limited to raising only those issues you or someone else raised at the public hearing described in this notice, or in written correspondence delivered to the Brentwood City Council at, or prior to, the public hearing. CITY OF BRENTWOOD /s/ Margaret Wimberly, CMC, City Clerk Dated: April 29, 2011 Brentwood Press No. 02-1273 Publish dates: May 13, 20, 2011

Appendix C

2010 Review of Completeness Form

2010 Urban Water Management Plan "Review for Completeness" Form

AGENCY NAME HERE

1. Coordination with Appropriate Agencies **(Water Code § 10620 (d)(1)(2))**

☐ Participated in area, regional, watershed or basinwide URBAN WATER MANAGEMENT PLAN _____ Reference & Page Number
Name of plan _____ Lead Agency _____

☐ Described the coordination of the plan preparation and anticipated benefits. _____ Reference & Page Number

Table 1
Public and agency coordination

Coordinating Agencies[1,2]	Participated in developing the plan	Commented on the draft	Attended public meetings	Was contacted for assistance	Was sent a copy of the draft plan	Was sent a notice of intention to adopt	Not involved / No information
Other water suppliers							
Water mgmt agencies							
Relevant public agencies							
General public							
Other							

[1] *Indicate the specific name of the agency with which coordination or outreach occurred.*
[2] *Check at least one box in each row.*

DWR Reviewer Comments:

2. Describe resource maximization / import minimization plan **(Water Code §10620 (f))**

☐ Described how water management tools / options maximize resources & minimize need to import water _____ Reference & Page Number

DWR Reviewer Comments:

3. Plan Updated in Years Ending in Five and Zero **(Water Code § 10621(a))**

☐ Updated and adopted plan _____ Date adopted _____ Reference & Page Number

DWR Reviewer Comments:

4. City and County Notification and Participation **(Water Code § 10621(b))**

☐ Provided 60-day notification to any city or county within service area of UWMP review and revision _____ Reference & Page Number

DWR Reviewer Comments:

5. Service Area Information **Water Code § 10631 (a))**

☐ Included current and projected population in 5-year increments for 20 years. _____ Reference & Page Number
☐ Provided population projections were based on data from state, regional or local agency _____ Reference & Page Number

Table 2
Population - current and projected

	2010	2015	2020	2025	2030	2035 - optional	Data source[2]
Service area population[1]							

[1] *Service area population is defined as the population served by the distribution system. See Technical Methodology 2: Service Area Population (2010 UWMP Guidebook, Section M).*
[2] *Provide the source of the population data provided.*

☐ Described climate characteristics that affect water management _____ Reference & Page Number
☐ Described other demographic factors affecting water management _____ Reference & Page Number

DWR Reviewer Comments:

6. Water Sources **(Water Code § 10631 (b))**

☐ Identified existing and planned water supply sources, to the extent practicable _____ Reference & Page Number
☐ Provided current water supply quantities _____ Reference & Page Number
☐ Provided planned water supply quantities _____ Reference & Page Number

Table 16
Water supplies - current and projected

Water Supply Sources		2010	2015	2020	2025	2030	2035 - optional
Water purchased from[1]:	Wholesaler supplied volume (yes/no)						
Wholesaler 1 (enter agency name)							
Wholesaler 2 (enter agency name)							
Wholesaler 3 (enter agency name)							
Supplier-produced groundwater[2]							
Supplier-produced surface water							
Transfers in							
Exchanges In							
Recycled Water							
Desalinated Water							
Other							
Other							
Total		0	0	0	0	0	0

Units (circle one): acre-feet per year million gallons per year cubic feet per year
[1] *Volumes shown here should be what was purchased in 2010 and what is anticipated to be purchased in the future. If these numbers differ from what is contracted, show the contracted quantities in*
[2] *Volumes shown here should be consistent with Tables 17 and 18.*

DWR Reviewer Comments:

2010 Urban Water Management Plan "Review for Completeness" Form

AGENCY NAME HERE

7. If Groundwater identified as existing or planned source **(Water Code §10631 (b)(1-4))**

☐ Agency uses or plans to use groundwater _____ Reference & Page Number

OR ☐ Agency does NOT use groundwater and does not have plans to use groundwater (Skip Section) _____ Reference & Page Number

Groundwater Management Plans

☐ No groundwater management plan adopted for applicable groundwater basin(s) _____ Reference & Page Number

☐ Groundwater management plan(s) have been adopted by the supplier _____ Reference & Page Number

☐ Other specific authorization(s) for groundwater management exist _____ Reference & Page Number

☐ If groundwater management plans exists, provided applicable groundwater management plans _____ Reference & Page Number

☐ Described each groundwater basin(s) (b)(2) _____ Reference & Page Number

Basin Adjudication _____ Reference & Page Number

☐ Basin is not adjudicated _____ Reference & Page Number

☐ Basin is adjudicated _____ Reference & Page Number

☐ If adjudicated, attached order or decree (b)(2) _____ Reference & Page Number

☐ If adjudicated, quantified amount of legal pumping right (b)(2) _____ Reference & Page Number

Basin Overdraft

☐ Basin not in overdraft _____ Reference & Page Number

☐ DWR Bulletin 118 Update 2003 identified, or projected to be, in overdraft (b)(2) _____ Reference & Page Number

☐ Included plan to eliminate overdraft (b)(2) _____ Reference & Page Number

☐ Provided analysis of location, amount and sufficiency, of groundwater pumped for the last five years (b)(3) _____ Reference & Page Number

☐ Provided analysis of location and amount of projected groundwater pumping for 20 years (b)(4) **IN TABLE 3** _____ Reference & Page Number

Table 18
Groundwater - volume pumped

Basin name(s)	Metered or Unmetered[1]	2006	2007	2008	2009	2010
Groundwater as a percent of total water supply						

Units (circle one): acre-feet per year million gallons per year cubic feet per year

[1] Indicate whether volume is based on volumeteric meter data or another method

Table 19
Groundwater - volume projected to be pumped

Basin name(s)	2015	2020	2025	2030	2035 - optional
Percent of total water supply					

Units are in acre-feet per year.
Include future planned expansion

DWR Reviewer Comments:

8. Reliability of Supply **(Water Code §10631 (c) (1-3)**

☐ Described the reliability of the water supply and vulnerability to seasonal or climatic shortage _____ Reference & Page Number

Table 28
Supply reliability - historic conditions

		Multiple Dry Water Years			
Average / Normal Water Year	Single Dry Water	Year 1	Year 2	Year 3	Year 4
Percent of Average/Normal Year:					

☐ Provided the basis of water year data _____ Reference & Page Number

Table 27
Basis of water year data

Water Year Type	Base Year(s)
Average Water Year	
Single-Dry Water Year	
Multiple-Dry Water Years	

_____ Reference & Page Number

_____ Reference & Page Number

_____ Reference & Page Number

Table 29
Factors resulting in inconsistency of supply

Water supply sources[1]	Specific source name, if any	Limitation quantification	Legal	Environmental	Water quality	Climatic	Additional information

Units (circle one): acre-feet per year million gallons per year cubic feet per year

[1] From Table 16.

☐ Described plans to supplement or replace inconsistent sources with alternative sources or DMMs _____ Reference & Page Number

☐ No inconsistent sources _____ Reference & Page Number

DWR Reviewer Comments:

2010 Urban Water Management Plan "Review for Completeness" Form

AGENCY NAME HERE

9. Transfer or Exchange Opportunities **(Water Code §10631 (d))**

☐ Describe short term and long term exchange or transfer opportunities _____ Reference & Page Number

OR ☐ No transfer or exchange opportunities (Skip Section) _____ Reference & Page Number

☐ Has intertie(s) for emergency purposes only _____ Reference & Page Number

Table 20
Transfer and exchange opportunities

Transfer agency	Transfer or exchange	Short term or long term	Proposed Volume
Total			

Units (circle one): acre-feet per year million gallons per year cubic feet per year

DWR Reviewer Comments:	

10. Water Use Provisions **(Water Code §10631 (e)(1)(2))**

☐ Quantified past water use by sector _____ Reference & Page Number

☐ Quantified current water use by sector _____ Reference & Page Number

☐ Projected future water use by sector _____ Reference & Page Number

Table 3
Water deliveries - actual, 2005

	2005				
	Metered		Not metered		Total
Water use sectors	# of accounts	Volume	# of accounts	Volume	Volume
Single family					0
Multi-family					0
Commercial					0
Industrial					0
Institutional/governmental					0
Landscape					0
Agriculture					0
Other					0
Total	0	0	0	0	0

Units (circle one): acre-feet per year million gallons per year cubic feet per year

Table 6
Water deliveries - actual, 2010

	2010				
	Metered		Not metered		Total
Water use sectors	# of accounts	Deliveries AFY	# of accounts	Deliveries AFY	Volume
Single family					0
Multi-family					0
Commercial					0
Industrial					0
Institutional/governmental					0
Landscape					0
Agriculture					0
Other					0
Total	0	0	0	0	0

Units (circle one): acre-feet per year million gallons per year cubic feet per year

Table 5
Water deliveries - projected, 2015

	2015				
	Metered		Not metered		Total
Water use sectors	# of accounts	Deliveries AFY	# of accounts	Deliveries AFY	Volume
Single family					0
Multi-family					0
Commercial					0
Industrial					0
Institutional/governmental					0
Landscape					0
Agriculture					0
Other					0
Total	0	0	0	0	0

Units (circle one): acre-feet per year million gallons per year cubic feet per year

Table 6
Water deliveries - projected, 2020

	2020				
	Metered		Not metered		Total
Water use sectors	# of accounts	Deliveries AFY	# of accounts	Deliveries AFY	Volume
Single family					0
Multi-family					0
Commercial					0
Industrial					0
Institutional/governmental					0
Landscape					0
Agriculture					0
Other					0
Total	0	0	0	0	0

Units (circle one): acre-feet per year million gallons per year cubic feet per year

2010 Urban Water Management Plan "Review for Completeness" Form

AGENCY NAME HERE

Table 7
Water deliveries - projected 2025, 2030, and 2035

	2025 metered		2030 metered		2035 - optional metered	
Water use sectors	# of accounts	Deliveries AFY	# of accounts	Deliveries AFY	# of accounts	Deliveries AFY
Single family						
Multi-family						
Commercial						
Industrial						
Institutional/governmental						
Landscape						
Agriculture						
Other						
Total	0	0	0	0	0	0

Units (circle one): acre-feet per year million gallons per year cubic feet per year

DWR Reviewer Comments:	

☐ Identified and quantified sales to other agencies _____ Reference & Page Number

OR ☐ No sales to other agencies _____ Reference & Page Number

Table 9
Sales to other water agencies

Water distributed	2005	2010	2015	2020	2025	2030	2035 - opt
name of agency			0	0	0	0	0
name of agency							
name of agency							
Total	0	0	0	0	0	0	0

Units (circle one): acre-feet per year million gallons per year cubic feet per year

☐ Identified and quantified additional water uses _____ Reference & Page Number

OR ☐ No additional water uses _____ Reference & Page Number

Table 10
Additional water uses and losses

Water use[1]	2005	2010	2015	2020	2025	2030	2035 -opt
Saline barriers							
Groundwater recharge							
Conjunctive use							
Raw water							
Recycled water							
System losses							
Other (define)							
Total	0	0	0	0	0	0	0

Units (circle one): acre-feet per year million gallons per year cubic feet per year

[1] *Any water accounted for in Tables 3 through 7 are not included in this table.*

Table 11
Total water use

Water Use	2005	2010	2015	2020	2025	2030	2035 - opt
Total water deliveries (from Tables 3 to 7)							
Sales to other water agencies (from Table 9)							
Additional water uses and losses (from Table 10)							
Total							

Units (circle one): acre-feet per year million gallons per year cubic feet per year

DWR Reviewer Comments:	

11. Per Capita Water Use and Water Use Targets **(Water Code §10608.20)**

☐ Base daily per capita water use is calculated according to provided methodologies

Table 13
Base period ranges

Base	Parameter	Value	Units
10- to 15-year base period	2008 total water deliveries		*see below*
	2008 total volume of delivered recycled water		*see below*
	2008 recycled water as a percent of total deliveries		percent
	Number of years in base period[1]		years
	Year beginning base period range		
	Year ending base period range[2]		
5-year base period	Number of years in base period	5	years
	Year beginning base period range		
	Year ending base period range[3]		

Units (circle one): acre-feet per year million gallons per year cubic feet per year

[1] *If the 2008 recycled water percent is less than 10 percent, then the first base period is a continuous 10-year period. If the amount of recycled water delivered in 2008 is 10 percent or greater, the first base period is a continuous 10- to 15-year period.*

[2] *The ending year must be between December 31, 2004 and December 31, 2010.*

[2] *The ending year must be between December 31, 2007 and December 31, 2010.*

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Table 14
Base daily per capita water use - 10- to 15-year range

Base period year		Distribution System Population	Daily system gross water use (mgd)	Annual daily per capita water use (gpcd)
Sequence Year	Calendar Year			
Year 1				
Year 2				
Year 3				
Year 4				
Year 5				
Year 6				
Year 7				
Year 8				
Year 9				
Year 10				
Year 11				
Year 12				
Year 13				
Year 14				
Year 15				
			Base Daily Per Capita Water Use[1]	0

Units (circle one): acre-feet per year million gallons per year cubic feet per year
[1] Add the values in the column and divid by the number of rows.

Table 15
Base daily per capita water use - 5-year range

Base period year		Distribution System Population	Daily system gross water use (mgd)	Annual daily per capita water use (gpcd)
Sequence Year	Calendar Year			
Year 1				
Year 2				
Year 3				
Year 4				
Year 5				
			Base Daily Per Capita Water Use[1]	0

Units (circle one): acre-feet per year million gallons per year cubic feet per year
[1] Add the values in the column and divid by the number of rows.

Target method used to determine urban water use target

- ☐ Target method 1
- ☐ Target method 2
- ☐ Target method 3
- ☐ Target method 4

☐ Urban water use target is calculated according to provided methodologies

_____ **gpcd**

☐ Interim urban water use target is calculated according to provided methodologies

_____ **gpcd**

DWR Reviewer Comments:	

12. Water Use Projections and Low Income Housing **(Water Code §10631.1(a))**

☐ Indicate how much of the water use projections provided in Tables 12 through 16 (above) is for single-family and multi-family residential low income housing. _____ Reference & Page Number

☐ Agency included deliveries to low-income housing in Tables 3-7 _____ Reference & Page Number

☐ No anticipated low income single or multifamily residential water demands

Table 8
Low income projected water demands

Low Income Water Demands[1]	2015	2020	2025	2030	2035 - opt
Single-family residential	0	0	0	0	0
Multi-family residential					
Total	0	0	0	0	0

Units (circle one): acre-feet per year million gallons per year cubic feet per year
[1] Provide demands either as directly estimated values or as a percent of demand.

DWR Reviewer Comments:	

13. 2010 Urban Water Management Plan "Review of DMMs for Completeness" Form **(Water Code §10631 (f) and (g)**

(Water Code §10631 (f) & (g), the 2005 Urban Water Management Plan "Review of DMMs for Completeness" Form is found on Sheet 2

IMPORTANT NOTE
TO BE ELIGIBLE FOR GRANTS OR LOANS, AB1420 HAS MANDATED IMPLEMENTATION, SCHEDULED IMPLEMENTATION, OR EXEMPTION FOR ALL DMMs.
TO ENSURE YOUR PLAN ADDRESSES THE PROVISIONS OF WATER CODE 10631(f) AND (g), PROVIDE COMPLETE DESCRIPTIONS OR BENEFIT/COST ANALYSES FOR ALL DMMs AS IDENTIFIED ON THE DMMs WORKSHEET.

☐ Each DMM has been addressed

DWR Reviewer Comments:	

2010 Urban Water Management Plan "Review for Completeness" Form

AGENCY NAME HERE

14. Planned Water Supply Projects and Programs **(Water Code §10631 (h))**

☐ Agency has future water supply projects planned that are not related to DMMs. _____ Reference & Page Number

OR ☐ Agency does NOT have any future water supply projects planned that are not related to DMMs (Skip Section). _____ Reference & Page Number

☐ Provided detailed description of expected future supply projects and programs _____ Reference & Page Number

☐ Provided timeline for each proposed project _____ Reference & Page Number

Table 26
Future Water Supply Projects

Project name[1]	Projected start date	Projected completion date	Potential project constraints[2]	Normal-year supply[3]	Single-dry year supply[3]	Multiple-dry year first year supply[3]	Multiple-dry year second year supply[3]	Multiple-dry year third year supply[3]
				0	0	0	0	0

Units (circle one): acre-feet per year million gallons per year cubic feet per year

[1] Water volumes presented here should be accounted for in Table 16.

2Indicate whether project is likely to happen and what constraints, if any, exist for project implementation.

[3] Provide estimated supply benefits, if available.

DWR Reviewer Comments:

15. Opportunities for development of desalinated water **(Water Code §10631 (i))**

☐ Agency uses or has future plans to use desalinated water. _____ Reference & Page Number

OR ☐ Agency does NOT have any opportunities for future use of desalinated water (Skip Section). _____ Reference & Page Number

Described opportunities for development of desalinated water, including, but not limited to,

☐ Ocean water

☐ Brackish ocean water

☐ Brackish groundwater

☐ Other

DWR Reviewer Comments:

16. District is a CUWCC signatory **(Water Code § 10631 (j))**

☐ Agency is a CUWCC member _____ Reference & Page Number

☐ Attached 2009-2010 biannual update to UWMP _____ Reference & Page Number

☐ Biannual updates is considered complete by CUWCC website _____ Reference & Page Number

DWR Reviewer Comments:

17. If Supplier receives or projects receiving water from a wholesale supplier **(Water Code §10631 (k))**

☐ Agency receives or plans to receive wholesale water _____ Reference & Page Number

OR ☐ Agency neither has nor planto receive future receipt of wholesale water _____ Reference & Page Number

☐ Agency provided written demand projections to wholesaler, 20 years _____ Reference & Page Number

Table 12
Retail agency demand projections provided to wholesale suppliers

Wholesaler	Contracted Volume[3]	2010	2015	2020	2025	2030	2035 -opt

☐ Wholesaler provided written water availability projections, by source, to agency, 20 years _____ Reference & Page Number
(if agency served by more than one wholesaler, duplicate this table and provide the source availability for each wholesaler)

Table 17
Wholesale supplies - existing and planned sources of water

Wholesale sources[1,2]	Contracted Volume[3]	2015	2020	2025	2030	2035 - opt
(source 1)						
(source 2)						
(source 3)						

Units (circle one): acre-feet per year million gallons per year cubic feet per year

[1] Water volumes presented here should be accounted for in Table 16.

[2] If the water supplier is a wholesaler, indicate all customers (excluding individual retail customers) to which water is sold. If the water supplier is a retailer, indicate each wholesale supplier, if more than one.

[3] Indicate the full amount of water

☐ Provided reliability of wholesale supply in writing by wholesale agency _____ Reference & Page Number
(if agency served by more than one wholesaler, duplicate this table and provide the source availability for each wholesaler)

☐ Wholesale supply reliability numbers provided in Table 31. _____ Reference & Page Number

☐ Factors resulting in inconsistency of wholesaler's supply are provided in Table 29. _____ Reference & Page Number

DWR Reviewer Comments:

2010 Urban Water Management Plan "Review for Completeness" Form

AGENCY NAME HERE

18. Water Shortage Contingency Plan Section - Stages of Action **(Water Code § 10632 (a))**

- ☐ Provided stages of action _____ Reference & Page Number
- ☐ Provided the water supply conditions for each stage _____ Reference & Page Number
- ☐ Included plan for 50 percent supply shortage _____ Reference & Page Number

Table 35
Water shortage contingency - rationing stages to address water supply shortages

Stage No.	Water Supply Conditions	% Shortage

[1] *One of the stages of action must be designed to address a 50 percent reduction in water supply.*

DWR Reviewer Comments:	

19. Water Shortage Contingency Plan Section - Three-Year Minimum Water Supply **(Water Code §10632 (b))**

- ☐ Identified driest 3-year period _____ Reference & Page Number
- ☐ Determined minimum water supply available by source for the next three years _____ Reference & Page Number

Table 31
Supply reliability - current water sources

Water supply sources[1]	Average / Normal Water Year Supply[2]	Single Dry Water Year Supply[2]	Multiple Dry Water Year Supply[2]			
			Year 1	Year 2	Year 3	Year 4
Percent of normal year:						

Units are in acre-feet per year.
[1] *From Table 16.*
[2] *See Table 27 for basis of water type years.*

DWR Reviewer Comments:	

20. Water Shortage Contingency Plan - Preparation for catastrophic water supply interruption **(Water Code §10632 (c))**

- ☐ Provided catastrophic supply interruption plan _____ Reference & Page Number
- ☐ Described actions to be taken during power outage _____ Reference & Page Number
- ☐ Described actions to be taken during earthquake _____ Reference & Page Number
- ☐ Described actions to be taken during other catastrophic interruptions _____ Reference & Page Number

DWR Reviewer Comments:	

21. Water Shortage Contingency Plan - Prohibitions, Consumption Reduction Methods, and Penalties **(Water Code § 10632 (d-f))**

- ☐ Listed the mandatory prohibitions against specific water use practices during water shortages _____ Reference & Page Number

Table 36
Water shortage contingency - mandatory prohibitions

Examples of Prohibitions	Stage When
Using potable water for street washing	
Other (name prohibition)	
Other (name prohibition)	
Other (name prohibition)	
Other (name prohibition)	
Other (name prohibition)	
Other (name prohibition)	

- ☐ Listed the consumption reduction methods the water supplier will use to reduce water use in the most restrictive stages with up to a 50% reduction. _____ Reference & Page Number

Table 37
Water shortage contingency - consumption reduction methods

Consumption	Stage When	Projected
name method		
name method		
name method		
name method		
name method		
name method		

- ☐ Listed penalties or charges for excessive use _____ Reference & Page Number

Table 38
Water shortage contingency - penalties and charges

Penalties or Charges	Stage When Penalty Takes Effect
Penalty for excess use	
Charge for excess use	
Other (name penalties or charges)	
Other (name penalties or charges)	
Other (name penalties or charges)	
Other (name penalties or charges)	
Other (name penalties or charges)	
Other (name penalties or charges)	

DWR Reviewer Comments:	

2010 Urban Water Management Plan "Review for Completeness" Form

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22. Water Shortage Contingency Plan - Revenue and Expenditure Impacts **(Water Code § 10632 (g))**

- ☐ Described how actions and conditions impact revenues _____ Reference & Page Number
  - ☐ Rate adjustments _____ Reference & Page Number
  - ☐ Development of reserves _____ Reference & Page Number
- ☐ Described how actions and conditions impact expenditures _____ Reference & Page Number
- ☐ Described measures to overcome the revenue and expenditure impacts _____ Reference & Page Number

DWR Reviewer Comments:	

23. Water Shortage Contingency Plan - Water Shortage Contingency Ordinance/Resolution **(Water Code § 10632 (h))**

- ☐ Attached a copy of the draft water shortage contingency resolution or ordinance. _____ Reference & Page Number

DWR Reviewer Comments:	

24. Water Shortage Contingency Plan - Reduction Measuring Mechanism **(Water Code § 10632 (i))**

- ☐ Provided mechanisms for determining actual reductions _____ Reference & Page Number
- ☐ No water shortage contingency resolution or ordinance _____ Reference & Page Number

DWR Reviewer Comments:	

25. Wastewater and Recycled Water - System description and disposal **(Water Code § 10633 (a))**

- ☐ Described the wastewater collection and treatment systems for the supplier's service area _____ Reference & Page Number
- ☐ Quantified the volume of wastewater collected and treated _____ Reference & Page Number
- ☐ Described methods of wastewater disposal _____ Reference & Page Number

Table 21
Recycled water - wastewater collection and treatment

Type of Wastewater	2005	2010	2015	2020	2025	2030	2035 - opt
Wastewater collected & treated in service area							
Volume that meets recycled water standard							

Units (circle one): acre-feet per year million gallons per year cubic feet per year

- ☐ Described methods of wastewater disposal _____ Reference & Page Number

Table 22
Recycled water - non-recycled wastewater disposal

Method of disposal	Treatment Level	2010	2015	2020	2025	2030	2035 - opt
Name of method							
Name of method							
Name of method							
Name of method							
	Total	0	0	0	0	0	0

Units (circle one): acre-feet per year million gallons per year cubic feet per year

DWR Reviewer Comments:	

26. Wastewater and Recycled Water - Uses and Projected Uses **(Water Code § 10633 (b - e))**

- ☐ Agency has access to recycled water. _____ Reference & Page Number

OR ☐ Agency does NOT have any access to recycled water (explanation provided) _____ Reference & Page Number

- ☐ The use of recycled water by the Agency is technically or economically feasible. _____ Reference & Page Number

OR ☐ The use of recycled water by the Agency is NOT technically or economically feasible (explanation provided) _____ Reference & Page Number

- ☐ No current (2010) use of recycled water _____ Reference & Page Number
- ☐ Described and quantified potential uses of recycled water _____ Reference & Page Number

Table 23
Recycled water - potential future use

User type	Description	Feasibility[1]	2015	2020	2025	2030	2035 - opt
Agricultural irrigation							
Landscape irrigation[2]							
Commercial irrigation[3]							
Golf course irrigation							
Wildlife habitat							
Wetlands							
Industrial reuse							
Groundwater recharge							
Seawater barrier							
Getothermal/Energy							
Indirect potable reuse							
Other (user type)							
Other (user type)							
	Total	0	0	0	0	0	0

Units (circle one): acre-feet per year million gallons per year cubic feet per year

[1] Technical and economic feasibility.

[2] Includes parks, schools, cemeteries, churches, residential, or other public facilities)

[3] Includes commercial building use such as landscaping, toilets, HVAC, etc) and commercial uses (car washes, laundries, nurseries, etc)

DWR Reviewer Comments:	

2010 Urban Water Management Plan "Review for Completeness" Form

AGENCY NAME HERE

27. Wastewater and Recycled Water - Projected Uses **(Water Code § 10633 (e))**

☐ Compared 2010 projections included in the 2005 UWMP with actual 2010 volumes _____ Reference & Page Number

OR ☐ No recycled water use for 2010 projected in 2005 UWMP

Table 24
Recycled water - 2005 UWMP use projection compared to 2010 actual

Use type	2010 actual use	2005 Projection for 2010[1]
Agricultural irrigation		
Landscape irrigation[2]		
Commercial irrigation[3]		
Golf course irrigation		
Wildlife habitat		
Wetlands		
Industrial reuse		
Groundwater recharge		
Seawater barrier		
Getothermal/Energy		
Indirect potable reuse		
Other (user type)		
Other (user type)		
Total	0	0

Units (circle one): acre-feet per year million gallons per year cubic feet per year

[1] From the 2005 UWMP. There has been some modification of use types. Data from the 2005 UWMP can be left in the existing catagories or modified to the new catagories, at the discretion of the water supplier.

[2] Includes parks, schools, cemeteries, churches, residential, or other public facilities)

[3] Includes commercial building use such as landscaping, toilets, HVAC, etc) and commercial uses (car washes, laundries, nurseries, etc)

DWR Reviewer Comments:

28. Wastewater and Recycled Water - optimize uses **(Water Code § 10633 (f))**

☐ Described actions that might be taken to encourage recycled water uses _____ Reference & Page Number

☐ Described projected results of these actions in terms of acre-feet of recycled water used per year _____ Reference & Page Number

Table 25
Methods to encourage recycled water use

Actions	Projectes Results					
	2010	2015	2020	2025	2030	2035 - opt
Financial incentives						
name of action						
name of action						
Total	0	0	0	0	0	0

Units (circle one): acre-feet per year million gallons per year cubic feet per year

DWR Reviewer Comments:

29. Wastewater and Recycled Water - Recycling Plan Agency Coordination **(Water Code § 10633(f))**

☐ Provided a recycled water use optimization plan which includes actions to facilitate the use of recycled water (dual distribution systems, promote recirculating uses) _____ Reference & Page Number

☐ Agency does not have recycled water use optimization plan _____ Reference & Page Number

☐ Described the coordination of the recycling plan preparation information to the extent available. _____ Reference & Page Number

DWR Reviewer Comments:

30. Water quality impacts on availability of supply **(Water Code §10634)**

☐ Discussed water quality impacts (by source) upon water management strategies and supply reliability _____ Reference & Page Number

OR ☐ No water quality impacts projected (explanation provided) _____ Reference & Page Number

Table 30
Water quality - current and projected water supply impacts

Water source	Description of condition	2010	2015	2020	2025	2030	2035 - opt

Units are in acre-feet per year.

DWR Reviewer Comments:

31. Supply and Demand Comparison to 20 Years **(Water Code § 10635 (a))**

☐ Compare the projected normal water supply to projected normal water demand over the next 20 years, in 5-year increments. _____ Reference & Page Number

Table 32
Supply and demand comparison - normal year

	2010	2015	2020	2025	2030	2035 - opt
Supply totals (from Table 16)						
Demand totals (From Table 11)						
Difference						
Difference as % of Supply						
Difference as % of Demand						

Units are in acre-feet per year.

DWR Reviewer Comments:

2010 Urban Water Management Plan "Review for Completeness" Form

AGENCY NAME HERE

32. Supply and Demand Comparison: Single-dry Year Scenario **(Water Code § 10635 (a))**

☐ Compare the projected single-dry year water supply to projected single-dry year water demand over the next 20 years, in 5-year increments. _____ Reference & Page Number

Table 33
Supply and demand comparison - single dry year

	2010	2015	2020	2025	2030 - opt	2030
Supply totals[1,2]						
Demand totals[2,3,4]						
Difference						
Difference as % of Supply						
Difference as % of Demand						

Units are in acre-feet per year.
[1] *Consider the same sources as in Table 16. If new sources of water are planned, add a column to the table and specify the source, timing, and amount of water.*
[2] *Provide in the text of the UWMP text that discusses how single-dry-year water supply volumes were determined.*
[3] *Consider the same demands as in Table 3. If new water demands are anticipated, add a column to the table and specify the source, timing, and amount of water.*
[4] *The urban water target determined in this UWMP will be considered when developing the 2020 water demands included in this table.*

DWR Reviewer Comments:

33. Supply and Demand Comparison: Multiple-dry Year Scenario **(Water Code § 10635 (a))**

☐ Project a multiple-dry year period (as identified in Table 27) occurring between 2011-2015 and compare projected supply and demand during those years _____ Reference & Page Number

☐ Project a multiple-dry year period (as identified in Table 27) occurring between 2016-2020 and compare projected supply and demand during those years _____ Reference & Page Number

☐ Project a multiple-dry year period (as identified in Table 27) occurring between 2021-2025 and compare projected supply and demand during those years _____ Reference & Page Number

☐ Project a multiple-dry year period (as identified in Table 27) occurring between 2026-2030 and compare projected supply and demand during those years _____ Reference & Page Number

Table 34
Supply and demand comparison - multiple dry-year events

		2010	2015	2020	2025	2030	2035 - opt
Multiple-dry year first year supply	**Supply totals**[1,2]						
	Demand totals[2,3,4]						
	Difference						
	Difference as % of Supply						
	Difference as % of Demand						
Multiple-dry year second year supply	**Supply totals**[1,2]						
	Demand totals[2,3,4]						
	Difference						
	Difference as % of Supply						
	Difference as % of Demand						
Multiple-dry year third year supply	**Supply totals**[1,2]						
	Demand totals[2,3,4]						
	Difference						
	Difference as % of Supply						
	Difference as % of Demand						

Units are in acre-feet per year.
[1] *Consider the same sources as in Table 16. If new sources of water are planned, add a column to the table and specify the source, timing, and amount of water.*
[2] *Provide in the text of the UWMP text that discusses how single-dry-year water supply volumes were determined.*
[3] *Consider the same demands as in Table 3. If new water demands are anticipated, add a column to the table and specify the source, timing, and amount of water.*
[4] *The urban water target determined in this UWMP will be considered when developing the 2020 water demands included in this table.*

DWR Reviewer Comments:

34. Provision of Water Service Reliability section to cities/counties within service area **(Water Code § 10635(b))**

☐ Provided Water Service Reliability section of UWMP to cities and counties within which it provides water supplies within 60 days of UWMP submission to DWR _____ Reference & Page Number

DWR Reviewer Comments:

35. Does the Plan Include Public Participation and Plan Adoption **(Water Code § 10642)**

☐ Attach a copy of adoption resolution _____ Reference & Page Number
☐ Encourage involvement of social, cultural & economic community groups _____ Reference & Page Number
☐ Plan available for public inspection _____ Reference & Page Number
☐ Provide proof of public hearing _____ Reference & Page Number
☐ Provided meeting notice to local governments _____ Reference & Page Number

DWR Reviewer Comments:

36. Review of implementation of 2005 UWMP **(Water Code § 10643)**

☐ Reviewed implementation plan and schedule of 2005 UWMP _____ Reference & Page Number
☐ Implemented in accordance with the schedule set forth in plan _____ Reference & Page Number
☐ 2005 UWMP not required _____ Reference & Page Number

DWR Reviewer Comments:

37. Provision of 2010 UWMP to local governments **(Water Code § 10644 (a))**

☐ Provide 2010 UWMP to DWR, and cities and counties within 30 days of adoption _____ Reference & Page Number

DWR Reviewer Comments:

38. Does the plan or correspondence accompanying it show where it is available for public review **(Water Code § 10645)**

☐ Does UWMP or correspondence accompanying it show where it is available for public review _____ Reference & Page Number

DWR Reviewer Comments:

Appendix D

Model Water Efficient Landscape Ordinance

California Code of Regulations
Title 23. Waters
Division 2. Department of Water Resources
Chapter 2.7. Model Water Efficient Landscape Ordinance

§ 490. Purpose.

(a) The State Legislature has found:

(1) that the waters of the state are of limited supply and are subject to ever increasing demands;

(2) that the continuation of California's economic prosperity is dependent on the availability of adequate supplies of water for future uses;

(3) that it is the policy of the State to promote the conservation and efficient use of water and to prevent the waste of this valuable resource;

(4) that landscapes are essential to the quality of life in California by providing areas for active and passive recreation and as an enhancement to the environment by cleaning air and water, preventing erosion, offering fire protection, and replacing ecosystems lost to development; and

(5) that landscape design, installation, maintenance and management can and should be water efficient; and

(6) that Section 2 of Article X of the California Constitution specifies that the right to use water is limited to the amount reasonably required for the beneficial use to be served and the right does not and shall not extend to waste or unreasonable method of use.

(b) Consistent with these legislative findings, the purpose of this model ordinance is to:

(1) promote the values and benefits of landscapes while recognizing the need to invest water and other resources as efficiently as possible;

(2) establish a structure for planning, designing, installing, maintaining and managing water efficient landscapes in new construction and rehabilitated projects;

(3) establish provisions for water management practices and water waste prevention for existing landscapes;

(4) use water efficiently without waste by setting a Maximum Applied Water Allowance as an upper limit for water use and reduce water use to the lowest practical amount;

(5) promote the benefits of consistent landscape ordinances with neighboring local and regional agencies;

(6) encourage local agencies and water purveyors to use economic incentives that promote the efficient use of water, such as implementing a tiered-rate structure; and

(7) encourage local agencies to designate the necessary authority that implements and enforces the provisions of the Model Water Efficient Landscape Ordinance or its local landscape ordinance.

Note: Authority cited: Section 65593, Government Code. Reference: Sections 65591, 65593, 65596, Government Code.

§ 490.1 Applicability

(a) After January 1, 2010, this ordinance shall apply to all of the following landscape projects:

(1) new construction and rehabilitated landscapes for public agency projects and private development projects with a landscape area equal to or greater than 2,500 square feet requiring a building or landscape permit, plan check or design review;

(2) new construction and rehabilitated landscapes which are developer-installed in single-family and multi-family projects with a landscape area equal to or greater than 2,500 square feet requiring a building or landscape permit, plan check, or design review;

(3) new construction landscapes which are homeowner-provided and/or homeowner-hired in single-family and multi-family residential projects with a total project landscape area equal to or greater than 5,000 square feet requiring a building or landscape permit, plan check or design review;

(4) existing landscapes limited to Sections 493, 493.1 and 493.2; and
(5) cemeteries. Recognizing the special landscape management needs of cemeteries, new and rehabilitated cemeteries are limited to Sections 492.4, 492.11 and 492.12; and existing cemeteries are limited to Sections 493, 493.1 and 493.2.
(b) This ordinance does not apply to:
(1) registered local, state or federal historical sites;
(2) ecological restoration projects that do not require a permanent irrigation system;
(3) mined-land reclamation projects that do not require a permanent irrigation system; or
(4) plant collections, as part of botanical gardens and arboretums open to the public.

Note: Authority Cited: Section 65595, Government Code. Reference: Section 65596, Government Code.

§ 491. Definitions.
The terms used in this ordinance have the meaning set forth below:
(a) "applied water" means the portion of water supplied by the irrigation system to the landscape.
(b) "automatic irrigation controller" means an automatic timing device used to remotely control valves that operate an irrigation system. Automatic irrigation controllers schedule irrigation events using either evapotranspiration (weather-based) or soil moisture data.
(c) "backflow prevention device" means a safety device used to prevent pollution or contamination of the water supply due to the reverse flow of water from the irrigation system.
(d) "Certificate of Completion" means the document required under Section 492.9.
(e) "certified irrigation designer" means a person certified to design irrigation systems by an accredited academic institution a professional trade organization or other program such as the US Environmental Protection Agency's WaterSense irrigation designer certification program and Irrigation Association's Certified Irrigation Designer program.
(f) "certified landscape irrigation auditor" means a person certified to perform landscape irrigation audits by an accredited academic institution, a professional trade organization or other program such as the US Environmental Protection Agency's WaterSense irrigation auditor certification program and Irrigation Association's Certified Landscape Irrigation Auditor program.
(g) "check valve" or "anti-drain valve" means a valve located under a sprinkler head, or other location in the irrigation system, to hold water in the system to prevent drainage from sprinkler heads when the sprinkler is off.
(h) "common interest developments" means community apartment projects, condominium projects, planned developments, and stock cooperatives per Civil Code Section 1351.
(i) "conversion factor (0.62)" means the number that converts acre-inches per acre per year to gallons per square foot per year
(j) "drip irrigation" means any non-spray low volume irrigation system utilizing emission devices with a flow rate measured in gallons per hour. Low volume irrigation systems are specifically designed to apply small volumes of water slowly at or near the root zone of plants.
(k) "ecological restoration project" means a project where the site is intentionally altered to establish a defined, indigenous, historic ecosystem.
(l)"effective precipitation" or "usable rainfall" (Eppt) means the portion of total precipitation which becomes available for plant growth.
(m) "emitter" means a drip irrigation emission device that delivers water slowly from the system to the soil.
(n) "established landscape" means the point at which plants in the landscape have developed significant root growth into the soil. Typically, most plants are established after one or two years of growth.
(o) "establishment period of the plants" means the first year after installing the plant in the landscape or the first two years if irrigation will be terminated after establishment. Typically, most plants are established after one or two years of growth.

(p) “Estimated Total Water Use” (ETWU) means the total water used for the landscape as described in Section 492.4.
(q) “ET adjustment factor” (ETAF) means a factor of 0.7, that, when applied to reference evapotranspiration, adjusts for plant factors and irrigation efficiency, two major influences upon the amount of water that needs to be applied to the landscape.
A combined plant mix with a site-wide average of 0.5 is the basis of the plant factor portion of this calculation. For purposes of the ETAF, the average irrigation efficiency is 0.71. Therefore, the ET Adjustment Factor is (0.7)=(0.5/0.71). ETAF for a Special Landscape Area shall not exceed 1.0. ETAF for existing non-rehabilitated landscapes is 0.8.
(r) “evapotranspiration rate” means the quantity of water evaporated from adjacent soil and other surfaces and transpired by plants during a specified time.
(s) “flow rate” means the rate at which water flows through pipes, valves and emission devices, measured in gallons per minute, gallons per hour, or cubic feet per second.
(t) “hardscapes” means any durable material (pervious and non-pervious).
(u) “homeowner-provided landscaping” means any landscaping either installed by a private individual for a single family residence or installed by a licensed contractor hired by a homeowner. A homeowner, for purposes of this ordinance, is a person who occupies the dwelling he or she owns. This excludes speculative homes, which are not owner-occupied dwellings.
(v) “hydrozone” means a portion of the landscaped area having plants with similar water needs. A hydrozone may be irrigated or non-irrigated.
(w) “infiltration rate” means the rate of water entry into the soil expressed as a depth of water per unit of time (e.g., inches per hour).
(x)“invasive plant species” means species of plants not historically found in California that spread outside cultivated areas and can damage environmental or economic resources. Invasive species may be regulated by county agricultural agencies as noxious species. “Noxious weeds” means any weed designated by the Weed Control Regulations in the Weed Control Act and identified on a Regional District noxious weed control list. Lists of invasive plants are maintained at the California Invasive Plant Inventory and USDA invasive and noxious weeds database.
(y) “irrigation audit” means an in-depth evaluation of the performance of an irrigation system conducted by a Certified Landscape Irrigation Auditor. An irrigation audit includes, but is not limited to: inspection, system tune-up, system test with distribution uniformity or emission uniformity, reporting overspray or runoff that causes overland flow, and preparation of an irrigation schedule.
(z) “irrigation efficiency” (IE) means the measurement of the amount of water beneficially used divided by the amount of water applied. Irrigation efficiency is derived from measurements and estimates of irrigation system characteristics and management practices. The minimum average irrigation efficiency for purposes of this ordinance is 0.71. Greater irrigation efficiency can be expected from well designed and maintained systems.
(aa) “irrigation survey” means an evaluation of an irrigation system that is less detailed than an irrigation audit. An irrigation survey includes, but is not limited to: inspection, system test, and written recommendations to improve performance of the irrigation system.
(bb) “irrigation water use analysis” means an analysis of water use data based on meter readings and billing data.
(cc) “landscape architect” means a person who holds a license to practice landscape architecture in the state of California Business and Professions Code, Section 5615.
(dd) “landscape area” means all the planting areas, turf areas, and water features in a landscape design plan subject to the Maximum Applied Water Allowance calculation. The landscape area does not include footprints of buildings or structures, sidewalks, driveways, parking lots, decks, patios, gravel or stone walks, other pervious or non-pervious hardscapes, and other non-irrigated areas designated for non-development (e.g., open spaces and existing native vegetation).

(ee) “landscape contractor” means a person licensed by the state of California to construct, maintain, repair, install, or subcontract the development of landscape systems.
(ff) “Landscape Documentation Package” means the documents required under Section 492.3.
(gg) “landscape project” means total area of landscape in a project as defined in “landscape area” for the purposes of this ordinance, meeting requirements under Section 490.1.
(hh) “lateral line” means the water delivery pipeline that supplies water to the emitters or sprinklers from the valve.
(ii) “local agency” means a city or county, including a charter city or charter county, that is responsible for adopting and implementing the ordinance. The local agency is also responsible for the enforcement of this ordinance, including but not limited to, approval of a permit and plan check or design review of a project.
(jj) “local water purveyor” means any entity, including a public agency, city, county, or private water company that provides retail water service.
(kk) “low volume irrigation” means the application of irrigation water at low pressure through a system of tubing or lateral lines and low-volume emitters such as drip, drip lines, and bubblers. Low volume irrigation systems are specifically designed to apply small volumes of water slowly at or near the root zone of plants.
(ll) “main line” means the pressurized pipeline that delivers water from the water source to the valve or outlet.
(mm) “Maximum Applied Water Allowance” (MAWA) means the upper limit of annual applied water for the established landscaped area as specified in Section 492.4. It is based upon the area’s reference evapotranspiration, the ET Adjustment Factor, and the size of the landscape area. The Estimated Total Water Use shall not exceed the Maximum Applied Water Allowance. Special Landscape Areas, including recreation areas, areas permanently and solely dedicated to edible plants such as orchards and vegetable gardens, and areas irrigated with recycled water are subject to the MAWA with an ETAF not to exceed 1.0.
(nn) “microclimate” means the climate of a small, specific area that may contrast with the climate of the overall landscape area due to factors such as wind, sun exposure, plant density, or proximity to reflective surfaces.
(oo) “mined-land reclamation projects” means any surface mining operation with a reclamation plan approved in accordance with the Surface Mining and Reclamation Act of 1975.
(pp) “mulch” means any organic material such as leaves, bark, straw, compost, or inorganic mineral materials such as rocks, gravel, and decomposed granite left loose and applied to the soil surface for the beneficial purposes of reducing evaporation, suppressing weeds, moderating soil temperature, and preventing soil erosion.
(qq) “new construction” means, for the purposes of this ordinance, a new building with a landscape or other new landscape, such as a park, playground, or greenbelt without an associated building.
(rr) “operating pressure” means the pressure at which the parts of an irrigation system are designed by the manufacturer to operate.
(ss) “overhead sprinkler irrigation systems” means systems that deliver water through the air (e.g., spray heads and rotors).
(tt) “overspray” means the irrigation water which is delivered beyond the target area.
(uu) “permit” means an authorizing document issued by local agencies for new construction or rehabilitated landscapes.
(vv) “pervious” means any surface or material that allows the passage of water through the material and into the underlying soil.
(ww) “plant factor” or “plant water use factor” is a factor , when multiplied by ETo, estimates the amount of water needed by plants. For purposes of this ordinance, the plant factor range for low water use plants is 0 to 0.3, the plant factor range for moderate water use plants is 0.4 to 0.6, and the plant

factor range for high water use plants is 0.7 to 1.0. Plant factors cited in this ordinance are derived from the Department of Water Resources 2000 publication "Water Use Classification of Landscape Species".
(xx) "precipitation rate" means the rate of application of water measured in inches per hour.
(yy) "project applicant" means the individual or entity submitting a Landscape Documentation Package required under Section 492.3, to request a permit, plan check, or design review from the local agency. A project applicant may be the property owner or his or her designee.
(zz) "rain sensor" or "rain sensing shutoff device" means a component which automatically suspends an irrigation event when it rains.
(aaa) "record drawing" or "as-builts" means a set of reproducible drawings which show significant changes in the work made during construction and which are usually based on drawings marked up in the field and other data furnished by the contractor.
(bbb) "recreational area" means areas dedicated to active play such as parks, sports fields, and golf courses where turf provides a playing surface.
(ccc) "recycled water", "reclaimed water", or "treated sewage effluent water" means treated or recycled waste water of a quality suitable for non-potable uses such as landscape irrigation and water features. This water is not intended for human consumption.
(ddd) "reference evapotranspiration" or "ETo" means a standard measurement of environmental parameters which affect the water use of plants. ETo is expressed in inches per day, month, or year as represented in Section 495.1, and is an estimate of the evapotranspiration of a large field of four- to seven-inch tall, cool-season grass that is well watered. Reference evapotranspiration is used as the basis of determining the Maximum Applied Water Allowance so that regional differences in climate can be accommodated.
(eee) "rehabilitated landscape" means any re-landscaping project that requires a permit , plan check, or design review, meets the requirements of Section 490.1, and the modified landscape area is equal to or greater than 2,500 square feet, is 50% of the total landscape area, and the modifications are completed within one year.
(fff) "runoff" means water which is not absorbed by the soil or landscape to which it is applied and flows from the landscape area. For example, runoff may result from water that is applied at too great a rate (application rate exceeds infiltration rate) or when there is a slope.
(ggg) "soil moisture sensing device" or "soil moisture sensor" means a device that measures the amount of water in the soil. The device may also suspend or initiate an irrigation event.
(hhh) "soil texture" means the classification of soil based on its percentage of sand, silt, and clay.
(iii)"Special Landscape Area" (SLA) means an area of the landscape dedicated solely to edible plants, areas irrigated with recycled water, water features using recycled water and areas dedicated to active play such as parks, sports fields, golf courses, and where turf provides a playing surface.
(jjj) "sprinkler head" means a device which delivers water through a nozzle.
(kkk) "static water pressure" means the pipeline or municipal water supply pressure when water is not flowing.
(lll) "station" means an area served by one valve or by a set of valves that operate simultaneously.
(mmm) "swing joint" means an irrigation component that provides a flexible, leak-free connection between the emission device and lateral pipeline to allow movement in any direction and to prevent equipment damage.
(nnn) "turf" means a ground cover surface of mowed grass. Annual bluegrass, Kentucky bluegrass, Perennial ryegrass, Red fescue, and Tall fescue are cool-season grasses. Bermudagrass, Kikuyugrass, Seashore Paspalum, St. Augustinegrass, Zoysiagrass, and Buffalo grass are warm-season grasses.
(ooo) "valve" means a device used to control the flow of water in the irrigation system.
(ppp) "water conserving plant species" means a plant species identified as having a low plant factor.
(qqq) "water feature" means a design element where open water performs an aesthetic or recreational function. Water features include ponds, lakes, waterfalls, fountains, artificial streams, spas, and swimming pools (where water is artificially supplied). The surface area of water features is included in

the high water use hydrozone of the landscape area. Constructed wetlands used for on-site wastewater treatment or stormwater best management practices that are not irrigated and used solely for water treatment or stormwater retention are not water features and, therefore, are not subject to the water budget calculation.
(rrr) "watering window" means the time of day irrigation is allowed.
(sss) "WUCOLS" means the Water Use Classification of Landscape Species published by the University of California Cooperative Extension, the Department of Water Resources and the Bureau of Reclamation, 2000.

Note: Authority Cited: Section 65595, Government Code. Reference: Sections 65592, 65596, Government Code.

§ 492. Provisions for New Construction or Rehabilitated Landscapes.
(a) A local agency may designate another agency, such as a water purveyor, to implement some or all of the requirements contained in this ordinance. Local agencies may collaborate with water purveyors to define each entity's specific responsibilities relating to this ordinance.

Note: Authority Cited: Section 65595, Government Code. Reference: Section 65596, Government Code.

§ 492.1 Compliance with Landscape Documentation Package.
(a) Prior to construction, the local agency shall:
(1) provide the project applicant with the ordinance and procedures for permits, plan checks, or design reviews;
(2) review the Landscape Documentation Package submitted by the project applicant;
(3) approve or deny the Landscape Documentation Package;
(4) issue a permit or approve the plan check or design review for the project applicant; and
(5) upon approval of the Landscape Documentation Package, submit a copy of the Water Efficient Landscape Worksheet to the local water purveyor.
(b) Prior to construction, the project applicant shall:
(1) submit a Landscape Documentation Package to the local agency.
(c) Upon approval of the Landscape Documentation Package by the local agency, the project applicant shall:
(1) receive a permit or approval of the plan check or design review and record the date of the permit in the Certificate of Completion;
(2) submit a copy of the approved Landscape Documentation Package along with the record drawings, and any other information to the property owner or his/her designee; and
(3) submit a copy of the Water Efficient Landscape Worksheet to the local water purveyor.

Note: Authority Cited: Section 65595, Government Code. Reference: Section 65596, Government Code.

§ 492.2 Penalties.
(a) A local agency may establish and administer penalties to the project applicant for non-compliance with the ordinance to the extent permitted by law.

Note: Authority Cited: Section 65595, Government Code. Reference: Section 65596, Government Code.

§ 492.3 Elements of the Landscape Documentation Package.

(a) The Landscape Documentation Package shall include the following six (6) elements:

(1) project information;

(A) date

(B) project applicant

(C) project address (if available, parcel and/or lot number(s))

(D) total landscape area (square feet)

(E) project type (e.g., new, rehabilitated, public, private, cemetery, homeowner-installed)

(F) water supply type (e.g., potable, recycled, well) and identify the local retail water purveyor if the applicant is not served by a private well

(G) checklist of all documents in Landscape Documentation Package

(H) project contacts to include contact information for the project applicant and property owner

(I) applicant signature and date with statement, "I agree to comply with the requirements of the water efficient landscape ordinance and submit a complete Landscape Documentation Package".

(2) Water Efficient Landscape Worksheet;

(A) hydrozone information table

(B) water budget calculations

1. Maximum Applied Water Allowance (MAWA)

2. Estimated Total Water Use (ETWU)

(3) soil management report;

(4) landscape design plan;

(5) irrigation design plan; and

(6) grading design plan.

Note: Authority Cited: Section 65595, Government Code. Reference: Section 65596, Government Code.

§ 492.4 Water Efficient Landscape Worksheet.

(a) A project applicant shall complete the Water Efficient Landscape Worksheet which contains two sections (see sample worksheet in Appendix B):

(1) a hydrozone information table (see Appendix B, Section A) for the landscape project; and

(2) a water budget calculation (see Appendix B, Section B) for the landscape project. For the calculation of the Maximum Applied Water Allowance and Estimated Total Water Use, a project applicant shall use the ETo values from the Reference Evapotranspiration Table in Appendix A. For geographic areas not covered in Appendix A, use data from other cities located nearby in the same reference evapotranspiration zone, as found in the CIMIS Reference Evapotranspiration Zones Map, Department of Water Resources, 1999.

(b) Water budget calculations shall adhere to the following requirements:

(1) The plant factor used shall be from WUCOLS. The plant factor ranges from 0 to 0.3 for low water use plants, from 0.4 to 0.6 for moderate water use plants, and from 0.7 to 1.0 for high water use plants.

(2) All water features shall be included in the high water use hydrozone and temporarily irrigated areas shall be included in the low water use hydrozone.

(3) All Special Landscape Areas shall be identified and their water use calculated as described below.

(4) ETAF for Special Landscape Areas shall not exceed 1.0.

(c) Maximum Applied Water Allowance

The Maximum Applied Water Allowance shall be calculated using the equation:

$$MAWA = (ETo)\ (0.62)\ [(0.7 \times LA) + (0.3 \times SLA)]$$

The example calculations below are hypothetical to demonstrate proper use of the equations and do not represent an existing and/or planned landscape project. The ETo values used in these calculations are from the Reference Evapotranspiration Table in Appendix A, for planning purposes only. For actual irrigation scheduling, automatic irrigation controllers are required and shall use current reference evapotranspiration data, such as from the California Irrigation Management Information System (CIMIS), other equivalent data, or soil moisture sensor data.

(1) Example MAWA calculation: a hypothetical landscape project in Fresno, CA with an irrigated landscape area of 50,000 square feet without any Special Landscape Area (SLA= 0, no edible plants, recreational areas, or use of recycled water). To calculate MAWA, the annual reference evapotranspiration value for Fresno is 51.1 inches as listed in the Reference Evapotranspiration Table in Appendix A.

MAWA = (ETo) (0.62) [(0.7 x LA) + (0.3 x SLA)]
MAWA = Maximum Applied Water Allowance (gallons per year)
ETo = Reference Evapotranspiration (inches per year)
0.62 = Conversion Factor (to gallons)
0.7 = ET Adjustment Factor (ETAF)
LA = Landscape Area including SLA (square feet)
0.3 = Additional Water Allowance for SLA
SLA = Special Landscape Area (square feet)
MAWA = (51.1 inches) (0.62) [(0.7 x 50,000 square feet) + (0.3 x 0)]
= 1,108,870 gallons per year
To convert from gallons per year to hundred-cubic-feet per year:
= 1,108,870/748 = 1,482 hundred-cubic-feet per year
(100 cubic feet = 748 gallons)

(2) In this next hypothetical example, the landscape project in Fresno, CA has the same ETo value of 51.1 inches and a total landscape area of 50,000 square feet. Within the 50,000 square foot project, there is now a 2,000 square foot area planted with edible plants. This 2,000 square foot area is considered to be a Special Landscape Area.

MAWA = (ETo) (0.62) [(0.7 x LA) + (0.3 x SLA)]
MAWA = (51.1 inches) (0.62) [(0.7 x 50,000 square feet) + (0.3 x 2,000 square feet)]
= 31.68 x [35,000 + 600] gallons per year
= 31.68 x 35,600 gallons per year
=1,127,808 gallons per year or 1,508 hundred-cubic-feet per year

(d) Estimated Total Water Use.

The Estimated Total Water Use shall be calculated using the equation below. The sum of the Estimated Total Water Use calculated for all hydrozones shall not exceed MAWA.

$$ETWU = (ETo)(0.62)\left(\frac{PF\ x\ HA}{IE} + SLA\right)$$

Where:

ETWU = Estimated Total Water Use per year (gallons)
ETo = Reference Evapotranspiration (inches)
PF = Plant Factor from WUCOLS (see Section 491)
HA = Hydrozone Area [high, medium, and low water use areas] (square feet)
SLA = Special Landscape Area (square feet)
0.62 = Conversion Factor
IE = Irrigation Efficiency (minimum 0.71)

(1) Example ETWU calculation: landscape area is 50,000 square feet; plant water use type, plant factor, and hydrozone area are shown in the table below. The ETo value is 51.1 inches per year. There are no Special Landscape Areas (recreational area, area permanently and solely dedicated to edible plants, and area irrigated with recycled water) in this example.

Hydrozone	Plant Water Use Type(s)	Plant Factor (PF)*	Hydrozone Area (HA) (square feet)	PF x HA (square feet)
1	High	0.8	7,000	5,600
2	High	0.7	10,000	7,000
3	Medium	0.5	16,000	8,000
4	Low	0.3	7,000	2,100
5	Low	0.2	10,000	2,000
			Sum	24,700

*Plant Factor from WUCOLS

$$ETWU = (51.1)(0.62)\left(\frac{24{,}700}{0.71} + 0\right)$$

= 1,102,116 gallons per year

Compare ETWU with MAWA: For this example MAWA = (51.1) (0.62) [(0.7 x 50,000) + (0.3 x 0)] = 1,108,870 gallons per year. The ETWU (1,102,116 gallons per year) is less than MAWA (1,108,870 gallons per year). In this example, the water budget complies with the MAWA.

(2) Example ETWU calculation: total landscape area is 50,000 square feet, 2,000 square feet of which is planted with edible plants. The edible plant area is considered a Special Landscape Area (SLA). The reference evapotranspiration value is 51.1 inches per year. The plant type, plant factor, and hydrozone area are shown in the table below.

Hydrozone	Plant Water Use Type(s)	Plant Factor (PF)*	Hydrozone Area (HA) (square feet)	PF x HA (square feet)
1	High	0.8	7,000	5,600
2	High	0.7	9,000	6,300
3	Medium	0.5	15,000	7,500
4	Low	0.3	7,000	2,100
5	Low	0.2	10,000	2,000
			Sum	23,500
6	SLA	1.0	2,000	2,000

*Plant Factor from WUCOLS

$$ETWU = (51.1)(0.62)\left(\frac{23{,}500}{0.71} + 2{,}000\right)$$

= (31.68) (33,099 + 2,000)

= 1,111,936 gallons per year

Compare ETWU with MAWA. For this example:
MAWA = (51.1) (0.62) [(0.7 x 50,000) + (0.3 x 2,000)]
= 31.68 x [35,000 + 600]
= 31.68 x 35,600
=1,127,808 gallons per year

The ETWU (1,111,936 gallons per year) is less than MAWA (1,127,808 gallons per year). For this example, the water budget complies with the MAWA.

Note: Authority Cited: Section 65595, Government Code. Reference: Section 65596, Government Code.

§ 492.5 Soil Management Report.

(a) In order to reduce runoff and encourage healthy plant growth, a soil management report shall be completed by the project applicant, or his/her designee, as follows:
(1) Submit soil samples to a laboratory for analysis and recommendations.
(A) Soil sampling shall be conducted in accordance with laboratory protocol, including protocols regarding adequate sampling depth for the intended plants.
(B) The soil analysis may include:
1. soil texture;
2. infiltration rate determined by laboratory test or soil texture infiltration rate table;
3. pH;
4. total soluble salts;
5. sodium;
6. percent organic matter; and
7. recommendations.
(2) The project applicant, or his/her designee, shall comply with one of the following:
(A) If significant mass grading is not planned, the soil analysis report shall be submitted to the local agency as part of the Landscape Documentation Package; or
(B) If significant mass grading is planned, the soil analysis report shall be submitted to the local agency as part of the Certificate of Completion.
(3) The soil analysis report shall be made available, in a timely manner, to the professionals preparing the landscape design plans and irrigation design plans to make any necessary adjustments to the design plans.
(4) The project applicant, or his/her designee, shall submit documentation verifying implementation of soil analysis report recommendations to the local agency with Certificate of Completion.

Note: Authority Cited: Section 65595, Government Code. Reference: Section 65596, Government Code.

§ 492.6 Landscape Design Plan.

(a) For the efficient use of water, a landscape shall be carefully designed and planned for the intended function of the project. A landscape design plan meeting the following design criteria shall be submitted as part of the Landscape Documentation Package.
(1) Plant Material
(A) Any plant may be selected for the landscape, providing the Estimated Total Water Use in the landscape area does not exceed the Maximum Applied Water Allowance. To encourage the efficient use of water, the following is highly recommended:
1. protection and preservation of native species and natural vegetation;
2. selection of water-conserving plant and turf species;

3. selection of plants based on disease and pest resistance;
4. selection of trees based on applicable local tree ordinances or tree shading guidelines; and
5. selection of plants from local and regional landscape program plant lists.
(B) Each hydrozone shall have plant materials with similar water use, with the exception of hydrozones with plants of mixed water use, as specified in Section 492.7(a)(2)(D).
(C) Plants shall be selected and planted appropriately based upon their adaptability to the climatic, geologic, and topographical conditions of the project site. To encourage the efficient use of water, the following is highly recommended:
1. use the Sunset Western Climate Zone System which takes into account temperature, humidity, elevation, terrain, latitude, and varying degrees of continental and marine influence on local climate;
2. recognize the horticultural attributes of plants (i.e., mature plant size, invasive surface roots) to minimize damage to property or infrastructure [e.g., buildings, sidewalks, power lines]; and
3. consider the solar orientation for plant placement to maximize summer shade and winter solar gain.
(D) Turf is not allowed on slopes greater than 25% where the toe of the slope is adjacent to an impermeable hardscape and where 25% means 1 foot of vertical elevation change for every 4 feet of horizontal length (rise divided by run x 100 = slope percent).
(E) A landscape design plan for projects in fire-prone areas shall address fire safety and prevention. A defensible space or zone around a building or structure is required per Public Resources Code Section 4291(a) and (b). Avoid fire-prone plant materials and highly flammable mulches.
(F) The use of invasive and/or noxious plant species is strongly discouraged.
(G) The architectural guidelines of a common interest development, which include community apartment projects, condominiums, planned developments, and stock cooperatives, shall not prohibit or include conditions that have the effect of prohibiting the use of low-water use plants as a group.
(2) Water Features
(A) Recirculating water systems shall be used for water features.
(B) Where available, recycled water shall be used as a source for decorative water features.
(C) Surface area of a water feature shall be included in the high water use hydrozone area of the water budget calculation.
(D) Pool and spa covers are highly recommended.
(3) Mulch and Amendments
(A) A minimum two inch (2″) layer of mulch shall be applied on all exposed soil surfaces of planting areas except in turf areas, creeping or rooting groundcovers, or direct seeding applications where mulch is contraindicated.
(B) Stabilizing mulching products shall be used on slopes.
(C) The mulching portion of the seed/mulch slurry in hydro-seeded applications shall meet the mulching requirement.
(D) Soil amendments shall be incorporated according to recommendations of the soil report and what is appropriate for the plants selected (see Section 492.5).
(b) The landscape design plan, at a minimum, shall:
(1) delineate and label each hydrozone by number, letter, or other method;
(2) identify each hydrozone as low, moderate, high water, or mixed water use. Temporarily irrigated areas of the landscape shall be included in the low water use hydrozone for the water budget calculation;
(3) identify recreational areas;
(4) identify areas permanently and solely dedicated to edible plants;
(5) identify areas irrigated with recycled water;
(6) identify type of mulch and application depth;
(7) identify soil amendments, type, and quantity;
(8) identify type and surface area of water features;
(9) identify hardscapes (pervious and non-pervious);

(10) identify location and installation details of any applicable stormwater best management practices that encourage on-site retention and infiltration of stormwater. Stormwater best management practices are encouraged in the landscape design plan and examples include, but are not limited to:
(A) infiltration beds, swales, and basins that allow water to collect and soak into the ground;
(B) constructed wetlands and retention ponds that retain water, handle excess flow, and filter pollutants; and
(C) pervious or porous surfaces (e.g., permeable pavers or blocks, pervious or porous concrete, etc.) that minimize runoff.
(11) identify any applicable rain harvesting or catchment technologies (e.g., rain gardens, cisterns, etc.);
(12) contain the following statement: "I have complied with the criteria of the ordinance and applied them for the efficient use of water in the landscape design plan"; and
(13) bear the signature of a licensed landscape architect, licensed landscape contractor, or any other person authorized to design a landscape. (See Sections 5500.1, 5615, 5641, 5641.1, 5641.2, 5641.3, 5641.4, 5641.5, 5641.6, 6701, 7027.5 of the Business and Professions Code, Section 832.27 of Title16 of the California Code of Regulations, and Section 6721 of the Food and Agriculture Code.)

Note: Authority Cited: Section 65595, Government Code. Reference: Section 65596, Government Code and Section 1351, Civil Code.

§ 492.7 Irrigation Design Plan.
(a) For the efficient use of water, an irrigation system shall meet all the requirements listed in this section and the manufacturers' recommendations. The irrigation system and its related components shall be planned and designed to allow for proper installation, management, and maintenance. An irrigation design plan meeting the following design criteria shall be submitted as part of the Landscape Documentation Package.
(1) System
(A) Dedicated landscape water meters are highly recommended on landscape areas smaller than 5,000 square feet to facilitate water management.
(B) Automatic irrigation controllers utilizing either evapotranspiration or soil moisture sensor data shall be required for irrigation scheduling in all irrigation systems.
(C) The irrigation system shall be designed to ensure that the dynamic pressure at each emission device is within the manufacturer's recommended pressure range for optimal performance.
1. If the static pressure is above or below the required dynamic pressure of the irrigation system, pressure-regulating devices such as inline pressure regulators, booster pumps, or other devices shall be installed to meet the required dynamic pressure of the irrigation system.
2. Static water pressure, dynamic or operating pressure. and flow reading of the water supply shall be measured at the point of connection. These pressure and flow measurements shall be conducted at the design stage. If the measurements are not available at the design stage, the measurements shall be conducted at installation.
(D) Sensors (rain, freeze, wind, etc.), either integral or auxiliary, that suspend or alter irrigation operation during unfavorable weather conditions shall be required on all irrigation systems, as appropriate for local climatic conditions. Irrigation should be avoided during windy or freezing weather or during rain.
(E) Manual shut-off valves (such as a gate valve, ball valve, or butterfly valve) shall be required, as close as possible to the point of connection of the water supply, to minimize water loss in case of an emergency (such as a main line break) or routine repair.

(F) Backflow prevention devices shall be required to protect the water supply from contamination by the irrigation system. A project applicant shall refer to the applicable local agency code (i.e., public health) for additional backflow prevention requirements.
(G) High flow sensors that detect and report high flow conditions created by system damage or malfunction are recommended.
(H) The irrigation system shall be designed to prevent runoff, low head drainage, overspray, or other similar conditions where irrigation water flows onto non-targeted areas, such as adjacent property, non-irrigated areas, hardscapes, roadways, or structures.
(I) Relevant information from the soil management plan, such as soil type and infiltration rate, shall be utilized when designing irrigation systems.
(J) The design of the irrigation system shall conform to the hydrozones of the landscape design plan.
(K) The irrigation system must be designed and installed to meet, at a minimum, the irrigation efficiency criteria as described in Section 492.4 regarding the Maximum Applied Water Allowance.
(L) It is highly recommended that the project applicant or local agency inquire with the local water purveyor about peak water operating demands (on the water supply system) or water restrictions that may impact the effectiveness of the irrigation system.
(M) In mulched planting areas, the use of low volume irrigation is required to maximize water infiltration into the root zone.
(N) Sprinkler heads and other emission devices shall have matched precipitation rates, unless otherwise directed by the manufacturer's recommendations.
(O) Head to head coverage is recommended. However, sprinkler spacing shall be designed to achieve the highest possible distribution uniformity using the manufacturer's recommendations.
(P) Swing joints or other riser-protection components are required on all risers subject to damage that are adjacent to high traffic areas.
(Q) Check valves or anti-drain valves are required for all irrigation systems.
(R) Narrow or irregularly shaped areas, including turf, less than eight (8) feet in width in any direction shall be irrigated with subsurface irrigation or low volume irrigation system.
(S) Overhead irrigation shall not be permitted within 24 inches of any non-permeable surface. Allowable irrigation within the setback from non-permeable surfaces may include drip, drip line, or other low flow non-spray technology. The setback area may be planted or unplanted. The surfacing of the setback may be mulch, gravel, or other porous material. These restrictions may be modified if:
1. the landscape area is adjacent to permeable surfacing and no runoff occurs; or
2. the adjacent non-permeable surfaces are designed and constructed to drain entirely to landscaping; or
3. the irrigation designer specifies an alternative design or technology, as part of the Landscape Documentation Package and clearly demonstrates strict adherence to irrigation system design criteria in Section 492.7 (a)(1)(H). Prevention of overspray and runoff must be confirmed during the irrigation audit.
(T) Slopes greater than 25% shall not be irrigated with an irrigation system with a precipitation rate exceeding 0.75 inches per hour. This restriction may be modified if the landscape designer specifies an alternative design or technology, as part of the Landscape Documentation Package, and clearly demonstrates no runoff or erosion will occur. Prevention of runoff and erosion must be confirmed during the irrigation audit.
(2) Hydrozone
(A) Each valve shall irrigate a hydrozone with similar site, slope, sun exposure, soil conditions, and plant materials with similar water use.
(B) Sprinkler heads and other emission devices shall be selected based on what is appropriate for the plant type within that hydrozone.
(C) Where feasible, trees shall be placed on separate valves from shrubs, groundcovers, and turf.
(D) Individual hydrozones that mix plants of moderate and low water use, or moderate and high water use, may be allowed if:

1. plant factor calculation is based on the proportions of the respective plant water uses and their plant factor; or
2. the plant factor of the higher water using plant is used for calculations.
(E) Individual hydrozones that mix high and low water use plants shall not be permitted.
(F) On the landscape design plan and irrigation design plan, hydrozone areas shall be designated by number, letter, or other designation. On the irrigation design plan, designate the areas irrigated by each valve, and assign a number to each valve. Use this valve number in the Hydrozone Information Table (see Appendix B Section A). This table can also assist with the irrigation audit and programming the controller.
(b) The irrigation design plan, at a minimum, shall contain:
(1) location and size of separate water meters for landscape;
(2) location, type and size of all components of the irrigation system, including controllers, main and lateral lines, valves, sprinkler heads, moisture sensing devices, rain switches, quick couplers, pressure regulators, and backflow prevention devices;
(3) static water pressure at the point of connection to the public water supply;
(4) flow rate (gallons per minute), application rate (inches per hour), and design operating pressure (pressure per square inch) for each station;
(5) recycled water irrigation systems as specified in Section 492.14;
(6) the following statement: "I have complied with the criteria of the ordinance and applied them accordingly for the efficient use of water in the irrigation design plan"; and
(7) the signature of a licensed landscape architect, certified irrigation designer, licensed landscape contractor, or any other person authorized to design an irrigation system. (See Sections 5500.1, 5615, 5641, 5641.1, 5641.2, 5641.3, 5641.4, 5641.5, 5641.6, 6701, 7027.5 of the Business and Professions Code, Section 832.27 of Title 16 of the California Code of Regulations, and Section 6721 of the Food and Agricultural Code.)

Note: Authority Cited: Section 65595, Government Code. Reference: Section 65596, Government Code.

§ 492.8 Grading Design Plan.
(a) For the efficient use of water, grading of a project site shall be designed to minimize soil erosion, runoff, and water waste. A grading plan shall be submitted as part of the Landscape Documentation Package. A comprehensive grading plan prepared by a civil engineer for other local agency permits satisfies this requirement.
(1) The project applicant shall submit a landscape grading plan that indicates finished configurations and elevations of the landscape area including:
(A) height of graded slopes;
(B) drainage patterns;
(C) pad elevations;
(D) finish grade; and
(E) stormwater retention improvements, if applicable.
(2) To prevent excessive erosion and runoff, it is highly recommended that project applicants:
(A) grade so that all irrigation and normal rainfall remains within property lines and does not drain on to non-permeable hardscapes;
(B) avoid disruption of natural drainage patterns and undisturbed soil; and
(C) avoid soil compaction in landscape areas.
(3) The grading design plan shall contain the following statement: "I have complied with the criteria of the ordinance and applied them accordingly for the efficient use of water in the grading design plan" and shall bear the signature of a licensed professional as authorized by law.

Note: Authority Cited: Section 65595, Government Code. Reference: Section 65596, Government Code.

§ 492.9 Certificate of Completion.

(a) The Certificate of Completion (see Appendix C for a sample certificate) shall include the following six (6) elements:

(1) project information sheet that contains:

(A) date;

(B) project name;

(C) project applicant name, telephone, and mailing address;

(D) project address and location; and

(E) property owner name, telephone, and mailing address;

(2) certification by either the signer of the landscape design plan, the signer of the irrigation design plan, or the licensed landscape contractor that the landscape project has been installed per the approved Landscape Documentation Package;

(A) where there have been significant changes made in the field during construction, these "as-built" or record drawings shall be included with the certification;

(3) irrigation scheduling parameters used to set the controller (see Section 492.10);

(4) landscape and irrigation maintenance schedule (see Section 492.11);

(5) irrigation audit report (see Section 492.12); and

(6) soil analysis report, if not submitted with Landscape Documentation Package, and documentation verifying implementation of soil report recommendations (see Section 492.5).

(b) The project applicant shall:

(1) submit the signed Certificate of Completion to the local agency for review;

(2) ensure that copies of the approved Certificate of Completion are submitted to the local water purveyor and property owner or his or her designee.

(c) The local agency shall:

(1) receive the signed Certificate of Completion from the project applicant;

(2) approve or deny the Certificate of Completion. If the Certificate of Completion is denied, the local agency shall provide information to the project applicant regarding reapplication, appeal, or other assistance.

Note: Authority Cited: Section 65595, Government Code. Reference: Section 65596, Government Code.

§ 492.10 Irrigation Scheduling.

(a) For the efficient use of water, all irrigation schedules shall be developed, managed, and evaluated to utilize the minimum amount of water required to maintain plant health. Irrigation schedules shall meet the following criteria:

(1) Irrigation scheduling shall be regulated by automatic irrigation controllers.

(2) Overhead irrigation shall be scheduled between 8:00 p.m. and 10:00 a.m. unless weather conditions prevent it. If allowable hours of irrigation differ from the local water purveyor, the stricter of the two shall apply. Operation of the irrigation system outside the normal watering window is allowed for auditing and system maintenance.

(3) For implementation of the irrigation schedule, particular attention must be paid to irrigation run times, emission device, flow rate, and current reference evapotranspiration, so that applied water meets the Estimated Total Water Use. Total annual applied water shall be less than or equal to Maximum Applied Water Allowance (MAWA). Actual irrigation schedules shall be regulated by automatic irrigation controllers using current reference evapotranspiration data (e.g., CIMIS) or soil moisture sensor data.

(4) Parameters used to set the automatic controller shall be developed and submitted for each of the following:

(A) the plant establishment period;

(B) the established landscape; and
(C) temporarily irrigated areas.
(5) Each irrigation schedule shall consider for each station all of the following that apply:
(A) irrigation interval (days between irrigation);
(B) irrigation run times (hours or minutes per irrigation event to avoid runoff);
(C) number of cycle starts required for each irrigation event to avoid runoff;
(D) amount of applied water scheduled to be applied on a monthly basis;
(E) application rate setting;
(F) root depth setting;
(G) plant type setting;
(H) soil type;
(I) slope factor setting;
(J) shade factor setting; and
(K) irrigation uniformity or efficiency setting.

Note: Authority Cited: Section 65595, Government Code. Reference: Section 65596, Government Code.

§ 492.11 Landscape and Irrigation Maintenance Schedule.
(a) Landscapes shall be maintained to ensure water use efficiency. A regular maintenance schedule shall be submitted with the Certificate of Completion.
(b) A regular maintenance schedule shall include, but not be limited to, routine inspection; adjustment and repair of the irrigation system and its components; aerating and dethatching turf areas; replenishing mulch; fertilizing; pruning; weeding in all landscape areas, and removing and obstruction to emission devices. Operation of the irrigation system outside the normal watering window is allowed for auditing and system maintenance.
(c) Repair of all irrigation equipment shall be done with the originally installed components or their equivalents.
(d) A project applicant is encouraged to implement sustainable or environmentally-friendly practices for overall landscape maintenance.

Note: Authority Cited: Section 65595, Government Code. Reference: Section 65596, Government Code.

§ 492.12 Irrigation Audit, Irrigation Survey, and Irrigation Water Use Analysis.
(a) All landscape irrigation audits shall be conducted by a certified landscape irrigation auditor.
(b) For new construction and rehabilitated landscape projects installed after January 1, 2010, as described in Section 490.1:
(1) the project applicant shall submit an irrigation audit report with the Certificate of Completion to the local agency that may include, but is not limited to: inspection, system tune-up, system test with distribution uniformity, reporting overspray or run off that causes overland flow, and preparation of an irrigation schedule;
(2) the local agency shall administer programs that may include, but not be limited to, irrigation water use analysis, irrigation audits, and irrigation surveys for compliance with the Maximum Applied Water Allowance.

Note: Authority Cited: Section 65595, Government Code. Reference: Section 65596, Government Code.

§ 492.13 Irrigation Efficiency.

(a) For the purpose of determining Maximum Applied Water Allowance, average irrigation efficiency is assumed to be 0.71. Irrigation systems shall be designed, maintained, and managed to meet or exceed an average landscape irrigation efficiency of 0.71.

Note: Authority Cited: Section 65595, Government Code. Reference: Section 65596, Government Code.

§ 492.14 Recycled Water.

(a) The installation of recycled water irrigation systems shall allow for the current and future use of recycled water, unless a written exemption has been granted as described in Section 492.14(b).
(b) Irrigation systems and decorative water features shall use recycled water unless a written exemption has been granted by the local water purveyor stating that recycled water meeting all public health codes and standards is not available and will not be available for the foreseeable future.
(c) All recycled water irrigation systems shall be designed and operated in accordance with all applicable local and State laws.
(d) Landscapes using recycled water are considered Special Landscape Areas. The ET Adjustment Factor for Special Landscape Areas shall not exceed 1.0.

Note: Authority Cited: Section 65595, Government Code. Reference: Section 65596, Government Code.

§ 492.15 Stormwater Management.

(a) Stormwater management practices minimize runoff and increase infiltration which recharges groundwater and improves water quality. Implementing stormwater best management practices into the landscape and grading design plans to minimize runoff and to increase on-site retention and infiltration are encouraged.
(b) Project applicants shall refer to the local agency or Regional Water Quality Control Board for information on any applicable stormwater ordinances and stormwater management plans.
(c) Rain gardens, cisterns, and other landscapes features and practices that increase rainwater capture and create opportunities for infiltration and/or onsite storage are recommended.

Note: Authority Cited: Section 65595, Government Code. Reference: Section 65596, Government Code.

§ 492.16 Public Education.

(a) Publications. Education is a critical component to promote the efficient use of water in landscapes. The use of appropriate principles of design, installation, management and maintenance that save water is encouraged in the community.
(1) A local agency shall provide information to owners of new, single-family residential homes regarding the design, installation, management, and maintenance of water efficient landscapes.
(b) Model Homes. All model homes that are landscaped shall use signs and written information to demonstrate the principles of water efficient landscapes described in this ordinance.
(1) Signs shall be used to identify the model as an example of a water efficient landscape featuring elements such as hydrozones, irrigation equipment, and others that contribute to the overall water efficient theme.
(2) Information shall be provided about designing, installing, managing, and maintaining water efficient landscapes.

Note: Authority Cited: Section 65595, Government Code. Reference: Section 65596, Government Code.

§ 492.17 Environmental Review.
(a) The local agency must comply with the California Environmental Quality Act (CEQA), as appropriate.

Note: Authority cited: Section 21082, Public Resources Code. Reference: Sections 21080, 21082, Public Resources Code.

§ 493. Provisions for Existing Landscapes.
(a) A local agency may designate another agency, such as a water purveyor, to implement some or all of the requirements contained in this ordinance. Local agencies may collaborate with water purveyors to define each entity's specific responsibilities relating to this ordinance.

Note: Authority Cited: Section 65595, Government Code. Reference: Section 65596, Government Code.

§ 493.1 Irrigation Audit, Irrigation Survey, and Irrigation Water Use Analysis.
(a) This section, 493.1, shall apply to all existing landscapes that were installed before January 1, 2010 and are over one acre in size.
(1) For all landscapes in 493.1(a) that have a water meter, the local agency shall administer programs that may include, but not be limited to, irrigation water use analyses, irrigation surveys, and irrigation audits to evaluate water use and provide recommendations as necessary to reduce landscape water use to a level that does not exceed the Maximum Applied Water Allowance for existing landscapes. The Maximum Applied Water Allowance for existing landscapes shall be calculated as: MAWA = (0.8) (ETo)(LA)(0.62).
(2) For all landscapes in 493.1(a), that do not have a meter, the local agency shall administer programs that may include, but not be limited to, irrigation surveys and irrigation audits to evaluate water use and provide recommendations as necessary in order to prevent water waste.
(b) All landscape irrigation audits shall be conducted by a certified landscape irrigation auditor.

Note: Authority Cited: Section 65595, Government Code. Reference: Section 65596, Government Code.

§ 493.2 Water Waste Prevention.
(a) Local agencies shall prevent water waste resulting from inefficient landscape irrigation by prohibiting runoff from leaving the target landscape due to low head drainage, overspray, or other similar conditions where water flows onto adjacent property, non-irrigated areas, walks, roadways, parking lots, or structures. Penalties for violation of these prohibitions shall be established locally.
(b) Restrictions regarding overspray and runoff may be modified if:
(1) the landscape area is adjacent to permeable surfacing and no runoff occurs; or
(2) the adjacent non-permeable surfaces are designed and constructed to drain entirely to landscaping.

Note: Authority cited: Section 65594, Government Code. Reference: Section 65596, Government Code.

§ 494. Effective Precipitation.
(a) A local agency may consider Effective Precipitation (25% of annual precipitation) in tracking water use and may use the following equation to calculate Maximum Applied Water Allowance:
MAWA= (ETo - Eppt) (0.62) [(0.7 x LA) + (0.3 x SLA)].

Note: Authority Cited: Section 65595, Government Code. Reference: Section 65596, Government Code.

Appendices.

Appendix A. Reference Evapotranspiration (ETo) Table.

Appendix A - Reference Evapotranspiration (ETo) Table*													
County and City	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual ETo**
ALAMEDA													
Fremont	1.5	1.9	3.4	4.7	5.4	6.3	6.7	6.0	4.5	3.4	1.8	1.5	47.0
Livermore	1.2	1.5	2.9	4.4	5.9	6.6	7.4	6.4	5.3	3.2	1.5	0.9	47.2
Oakland	1.5	1.5	2.8	3.9	5.1	5.3	6.0	5.5	4.8	3.1	1.4	0.9	41.8
Oakland Foothills	1.1	1.4	2.7	3.7	5.1	6.4	5.8	4.9	3.6	2.6	1.4	1.0	39.6
Pleasanton	0.8	1.5	2.9	4.4	5.6	6.7	7.4	6.4	4.7	3.3	1.5	1.0	46.2
Union City	1.4	1.8	3.1	4.2	5.4	5.9	6.4	5.7	4.4	3.1	1.5	1.2	44.2
ALPINE													
Markleeville	0.7	0.9	2.0	3.5	5.0	6.1	7.3	6.4	4.4	2.6	1.2	0.5	40.6
AMADOR													
Jackson	1.2	1.5	2.8	4.4	6.0	7.2	7.9	7.2	5.3	3.2	1.4	0.9	48.9
Shanandoah Valley	1.0	1.7	2.9	4.4	5.6	6.8	7.9	7.1	5.2	3.6	1.7	1.0	48.8
BUTTE													
Chico	1.2	1.8	2.9	4.7	6.1	7.4	8.5	7.3	5.4	3.7	1.7	1.0	51.7
Durham	1.1	1.8	3.2	5.0	6.5	7.4	7.8	6.9	5.3	3.6	1.7	1.0	51.1
Gridley	1.2	1.8	3.0	4.7	6.1	7.7	8.5	7.1	5.4	3.7	1.7	1.0	51.9
Oroville	1.2	1.7	2.8	4.7	6.1	7.6	8.5	7.3	5.3	3.7	1.7	1.0	51.5
CALAVERAS													
San Andreas	1.2	1.5	2.8	4.4	6.0	7.3	7.9	7.0	5.3	3.2	1.4	0.7	48.8
COLUSA													
Colusa	1.0	1.7	3.4	5.0	6.4	7.6	8.3	7.2	5.4	3.8	1.8	1.1	52.8
Williams	1.2	1.7	2.9	4.5	6.1	7.2	8.5	7.3	5.3	3.4	1.6	1.0	50.8
CONTRA COSTA													
Benicia	1.3	1.4	2.7	3.8	4.9	5.0	6.4	5.5	4.4	2.9	1.2	0.7	40.3
Brentwood	1.0	1.5	2.9	4.5	6.1	7.1	7.9	6.7	5.2	3.2	1.4	0.7	48.3
Concord	1.1	1.4	2.4	4.0	5.5	5.9	7.0	6.0	4.8	3.2	1.3	0.7	43.4
Courtland	0.9	1.5	2.9	4.4	6.1	6.9	7.9	6.7	5.3	3.2	1.4	0.7	48.0
Martinez	1.2	1.4	2.4	3.9	5.3	5.6	6.7	5.6	4.7	3.1	1.2	0.7	41.8
Moraga	1.2	1.5	3.4	4.2	5.5	6.1	6.7	5.9	4.6	3.2	1.6	1.0	44.9
Pittsburg	1.0	1.5	2.8	4.1	5.6	6.4	7.4	6.4	5.0	3.2	1.3	0.7	45.4
Walnut Creek	0.8	1.5	2.9	4.4	5.6	6.7	7.4	6.4	4.7	3.3	1.5	1.0	46.2
DEL NORTE													
Crescent City	0.5	0.9	2.0	3.0	3.7	3.5	4.3	3.7	3.0	2.0	0.9	0.5	27.7
EL DORADO													
Camino	0.9	1.7	2.5	3.9	5.9	7.2	7.8	6.8	5.1	3.1	1.5	0.9	47.3
FRESNO													
Clovis	1.0	1.5	3.2	4.8	6.4	7.7	8.5	7.3	5.3	3.4	1.4	0.7	51.4
Coalinga	1.2	1.7	3.1	4.6	6.2	7.2	8.5	7.3	5.3	3.4	1.6	0.7	50.9
Firebaugh	1.0	1.8	3.7	5.7	7.3	8.1	8.2	7.2	5.5	3.9	2.0	1.1	55.4
FivePoints	1.3	2.0	4.0	6.1	7.7	8.5	8.7	8.0	6.2	4.5	2.4	1.2	60.4
FRESNO													
Fresno	0.9	1.7	3.3	4.8	6.7	7.8	8.4	7.1	5.2	3.2	1.4	0.6	51.1
Fresno State	0.9	1.6	3.2	5.2	7.0	8.0	8.7	7.6	5.4	3.6	1.7	0.9	53.7
Friant	1.2	1.5	3.1	4.7	6.4	7.7	8.5	7.3	5.3	3.4	1.4	0.7	51.3
Kerman	0.9	1.5	3.2	4.8	6.6	7.7	8.4	7.2	5.3	3.4	1.4	0.7	51.2
Kingsburg	1.0	1.5	3.4	4.8	6.6	7.7	8.4	7.2	5.3	3.4	1.4	0.7	51.6
Mendota	1.5	2.5	4.6	6.2	7.9	8.6	8.8	7.5	5.9	4.5	2.4	1.5	61.7
Orange Cove	1.2	1.9	3.5	4.7	7.4	8.5	8.9	7.9	5.9	3.7	1.8	1.2	56.7
Panoche	1.1	2.0	4.0	5.6	7.8	8.5	8.3	7.3	5.6	3.9	1.8	1.2	57.2
Parlier	1.0	1.9	3.6	5.2	6.8	7.6	8.1	7.0	5.1	3.4	1.7	0.9	52.0
Reedley	1.1	1.5	3.2	4.7	6.4	7.7	8.5	7.3	5.3	3.4	1.4	0.7	51.3
Westlands	0.9	1.7	3.8	6.3	8.0	8.6	8.6	7.8	5.9	4.3	2.1	1.1	58.8

Appendix A - Reference Evapotranspiration (ETo) Table*													
County and City	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual ETo**
GLENN													
Orland	1.1	1.8	3.4	5.0	6.4	7.5	7.9	6.7	5.3	3.9	1.8	1.4	52.1
Willows	1.2	1.7	2.9	4.7	6.1	7.2	8.5	7.3	5.3	3.6	1.7	1.0	51.3
HUMBOLDT													
Eureka	0.5	1.1	2.0	3.0	3.7	3.7	3.7	3.7	3.0	2.0	0.9	0.5	27.5
Ferndale	0.5	1.1	2.0	3.0	3.7	3.7	3.7	3.7	3.0	2.0	0.9	0.5	27.5
Garberville	0.6	1.2	2.2	3.1	4.5	5.0	5.5	4.9	3.8	2.4	1.0	0.7	34.9
Hoopa	0.5	1.1	2.1	3.0	4.4	5.4	6.1	5.1	3.8	2.4	0.9	0.7	35.6
IMPERIAL													
Brawley	2.8	3.8	5.9	8.0	10.4	11.5	11.7	10.0	8.4	6.2	3.5	2.1	84.2
Calipatria/Mulberry	2.4	3.2	5.1	6.8	8.6	9.2	9.2	8.6	7.0	5.2	3.1	2.3	70.7
El Centro	2.7	3.5	5.6	7.9	10.1	11.1	11.6	9.5	8.3	6.1	3.3	2.0	81.7
Holtville	2.8	3.8	5.9	7.9	10.4	11.6	12.0	10.0	8.6	6.2	3.5	2.1	84.7
Meloland	2.5	3.2	5.5	7.5	8.9	9.2	9.0	8.5	6.8	5.3	3.1	2.2	71.6
Palo Verde II	2.5	3.3	5.7	6.9	8.5	8.9	8.6	7.9	6.2	4.5	2.9	2.3	68.2
Seeley	2.7	3.5	5.9	7.7	9.7	10.1	9.3	8.3	6.9	5.5	3.4	2.2	75.4
Westmoreland	2.4	3.3	5.3	6.9	8.7	9.6	9.6	8.7	6.9	5.0	3.0	2.2	71.4
Yuma	2.5	3.4	5.3	6.9	8.7	9.6	9.6	8.7	6.9	5.0	3.0	2.2	71.6
INYO													
Bishop	1.7	2.7	4.8	6.7	8.2	10.9	7.4	9.6	7.4	4.8	2.5	1.6	68.3
Death Valley Jct	2.2	3.3	5.4	7.7	9.8	11.1	11.4	10.1	8.3	5.4	2.9	1.7	79.1
Independence	1.7	2.7	3.4	6.6	8.5	9.5	9.8	8.5	7.1	3.9	2.0	1.5	65.2
Lower Haiwee Res.	1.8	2.7	4.4	7.1	8.5	9.5	9.8	8.5	7.1	4.2	2.6	1.5	67.6
Oasis	2.7	2.8	5.9	8.0	10.4	11.7	11.6	10.0	8.4	6.2	3.4	2.1	83.1
KERN													
Arvin	1.2	1.8	3.5	4.7	6.6	7.4	8.1	7.3	5.3	3.4	1.7	1.0	51.9
Bakersfield	1.0	1.8	3.5	4.7	6.6	7.7	8.5	7.3	5.3	3.5	1.6	0.9	52.4
Bakersfield/Bonanza	1.2	2.2	3.7	5.7	7.4	8.2	8.7	7.8	5.7	4.0	2.1	1.2	57.9
Bakersfield/Greenlee	1.2	2.2	3.7	5.7	7.4	8.2	8.7	7.8	5.7	4.0	2.1	1.2	57.9
KERN													
Belridge	1.4	2.2	4.1	5.5	7.7	8.5	8.6	7.8	6.0	3.8	2.0	1.5	59.2
Blackwells Corner	1.4	2.1	3.8	5.4	7.0	7.8	8.5	7.7	5.8	3.9	1.9	1.2	56.6
Buttonwillow	1.0	1.8	3.2	4.7	6.6	7.7	8.5	7.3	5.4	3.4	1.5	0.9	52.0
China Lake	2.1	3.2	5.3	7.7	9.2	10.0	11.0	9.8	7.3	4.9	2.7	1.7	74.8
Delano	0.9	1.8	3.4	4.7	6.6	7.7	8.5	7.3	5.4	3.4	1.4	0.7	52.0
Famoso	1.3	1.9	3.5	4.8	6.7	7.6	8.0	7.3	5.5	3.5	1.7	1.3	53.1
Grapevine	1.3	1.8	3.1	4.4	5.6	6.8	7.6	6.8	5.9	3.4	1.9	1.0	49.5
Inyokern	2.0	3.1	4.9	7.3	8.5	9.7	11.0	9.4	7.1	5.1	2.6	1.7	72.4
Isabella Dam	1.2	1.4	2.8	4.4	5.8	7.3	7.9	7.0	5.0	3.2	1.7	0.9	48.4
Lamont	1.3	2.4	4.4	4.6	6.5	7.0	8.8	7.6	5.7	3.7	1.6	0.8	54.4
Lost Hills	1.6	2.2	3.7	5.1	6.8	7.8	8.7	7.8	5.7	4.0	2.1	1.6	57.1
McFarland/Kern	1.2	2.1	3.7	5.6	7.3	8.0	8.3	7.4	5.6	4.1	2.0	1.2	56.5
Shafter	1.0	1.7	3.4	5.0	6.6	7.7	8.3	7.3	5.4	3.4	1.5	0.9	52.1
Taft	1.3	1.8	3.1	4.3	6.2	7.3	8.5	7.3	5.4	3.4	1.7	1.0	51.2
Tehachapi	1.4	1.8	3.2	5.0	6.1	7.7	7.9	7.3	5.9	3.4	2.1	1.2	52.9
KINGS													
Caruthers	1.6	2.5	4.0	5.7	7.8	8.7	9.3	8.4	6.3	4.4	2.4	1.6	62.7
Corcoran	1.6	2.2	3.7	5.1	6.8	7.8	8.7	7.8	5.7	4.0	2.1	1.6	57.1
Hanford	0.9	1.5	3.4	5.0	6.6	7.7	8.3	7.2	5.4	3.4	1.4	0.7	51.5
Kettleman	1.1	2.0	4.0	6.0	7.5	8.5	9.1	8.2	6.1	4.5	2.2	1.1	60.2
Lemoore	0.9	1.5	3.4	5.0	6.6	7.7	8.3	7.3	5.4	3.4	1.4	0.7	51.7
Stratford	0.9	1.9	3.9	6.1	7.8	8.6	8.8	7.7	5.9	4.1	2.1	1.0	58.7

Appendix A - Reference Evapotranspiration (ETo) Table*													
County and City	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual ETo**
LAKE													
Lakeport	1.1	1.3	2.6	3.5	5.1	6.0	7.3	6.1	4.7	2.9	1.2	0.9	42.8
Lower Lake	1.2	1.4	2.7	4.5	5.3	6.3	7.4	6.4	5.0	3.1	1.3	0.9	45.4
LASSEN													
Buntingville	1.0	1.7	3.5	4.9	6.2	7.3	8.4	7.5	5.4	3.4	1.5	0.9	51.8
Ravendale	0.6	1.1	2.3	4.1	5.6	6.7	7.9	7.3	4.7	2.8	1.2	0.5	44.9
Susanville	0.7	1.0	2.2	4.1	5.6	6.5	7.8	7.0	4.6	2.8	1.2	0.5	44.0
LOS ANGELES													
Burbank	2.1	2.8	3.7	4.7	5.1	6.0	6.6	6.7	5.4	4.0	2.6	2.0	51.7
Claremont	2.0	2.3	3.4	4.6	5.0	6.0	7.0	7.0	5.3	4.0	2.7	2.1	51.3
El Dorado	1.7	2.2	3.6	4.8	5.1	5.7	5.9	5.9	4.4	3.2	2.2	1.7	46.3
Glendale	2.0	2.2	3.3	3.8	4.7	4.8	5.7	5.6	4.3	3.3	2.2	1.8	43.7
Glendora	2.0	2.5	3.6	4.9	5.4	6.1	7.3	6.8	5.7	4.2	2.6	2.0	53.1
Gorman	1.6	2.2	3.4	4.6	5.5	7.4	7.7	7.1	5.9	3.6	2.4	1.1	52.4
Hollywood Hills	2.1	2.2	3.8	5.4	6.0	6.5	6.7	6.4	5.2	3.7	2.8	2.1	52.8
Lancaster	2.1	3.0	4.6	5.9	8.5	9.7	11.0	9.8	7.3	4.6	2.8	1.7	71.1
Long Beach	1.8	2.1	3.3	3.9	4.5	4.3	5.3	4.7	3.7	2.8	1.8	1.5	39.7
Los Angeles	2.2	2.7	3.7	4.7	5.5	5.8	6.2	5.9	5.0	3.9	2.6	1.9	50.1
LOS ANGELES													
Monrovia	2.2	2.3	3.8	4.3	5.5	5.9	6.9	6.4	5.1	3.2	2.5	2.0	50.2
Palmdale	2.0	2.6	4.6	6.2	7.3	8.9	9.8	9.0	6.5	4.7	2.7	2.1	66.2
Pasadena	2.1	2.7	3.7	4.7	5.1	6.0	7.1	6.7	5.6	4.2	2.6	2.0	52.3
Pearblossom	1.7	2.4	3.7	4.7	7.3	7.7	9.9	7.9	6.4	4.0	2.6	1.6	59.9
Pomona	1.7	2.0	3.4	4.5	5.0	5.8	6.5	6.4	4.7	3.5	2.3	1.7	47.5
Redondo Beach	2.2	2.4	3.3	3.8	4.5	4.7	5.4	4.8	4.4	2.8	2.4	2.0	42.6
San Fernando	2.0	2.7	3.5	4.6	5.5	5.9	7.3	6.7	5.3	3.9	2.6	2.0	52.0
Santa Clarita	2.8	2.8	4.1	5.6	6.0	6.8	7.6	7.8	5.8	5.2	3.7	3.2	61.5
Santa Monica	1.8	2.1	3.3	4.5	4.7	5.0	5.4	5.4	3.9	3.4	2.4	2.2	44.2
MADERA													
Chowchilla	1.0	1.4	3.2	4.7	6.6	7.8	8.5	7.3	5.3	3.4	1.4	0.7	51.4
Madera	0.9	1.4	3.2	4.8	6.6	7.8	8.5	7.3	5.3	3.4	1.4	0.7	51.5
Raymond	1.2	1.5	3.0	4.6	6.1	7.6	8.4	7.3	5.2	3.4	1.4	0.7	50.5
MARIN													
Black Point	1.1	1.7	3.0	4.2	5.2	6.2	6.6	5.8	4.3	2.8	1.3	0.9	43.0
Novato	1.3	1.5	2.4	3.5	4.4	6.0	5.9	5.4	4.4	2.8	1.4	0.7	39.8
Point San Pedro	1.1	1.7	3.0	4.2	5.2	6.2	6.6	5.8	4.3	2.8	1.3	0.9	43.0
San Rafael	1.2	1.3	2.4	3.3	4.0	4.8	4.8	4.9	4.3	2.7	1.3	0.7	35.8
MARIPOSA													
Coulterville	1.1	1.5	2.8	4.4	5.9	7.3	8.1	7.0	5.3	3.4	1.4	0.7	48.8
Mariposa	1.1	1.5	2.8	4.4	5.9	7.4	8.2	7.1	5.0	3.4	1.4	0.7	49.0
Yosemite Village	0.7	1.0	2.3	3.7	5.1	6.5	7.1	6.1	4.4	2.9	1.1	0.6	41.4
MENDOCINO													
Fort Bragg	0.9	1.3	2.2	3.0	3.7	3.5	3.7	3.7	3.0	2.3	1.2	0.7	29.0
Hopland	1.1	1.3	2.6	3.4	5.0	5.9	6.5	5.7	4.5	2.8	1.3	0.7	40.9
Point Arena	1.0	1.3	2.3	3.0	3.7	3.9	3.7	3.7	3.0	2.3	1.2	0.7	29.6
Sanel Valley	1.0	1.6	3.0	4.6	6.0	7.0	8.0	7.0	5.2	3.4	1.4	0.9	49.1
Ukiah	1.0	1.3	2.6	3.3	5.0	5.8	6.7	5.9	4.5	2.8	1.3	0.7	40.9
MERCED													
Kesterson	0.9	1.7	3.4	5.5	7.3	8.2	8.6	7.4	5.5	3.8	1.8	0.9	55.1
Los Banos	1.0	1.5	3.2	4.7	6.1	7.4	8.2	7.0	5.3	3.4	1.4	0.7	50.0
Merced	1.0	1.5	3.2	4.7	6.6	7.9	8.5	7.2	5.3	3.4	1.4	0.7	51.5

Appendix A - Reference Evapotranspiration (ETo) Table*													
County and City	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual ETo**
MODOC													
Modoc/Alturas	0.9	1.4	2.8	3.7	5.1	6.2	7.5	6.6	4.6	2.8	1.2	0.7	43.2
MONO													
Bridgeport	0.7	0.9	2.2	3.8	5.5	6.6	7.4	6.7	4.7	2.7	1.2	0.5	43.0
MONTEREY													
Arroyo Seco	1.5	2.0	3.7	5.4	6.3	7.3	7.2	6.7	5.0	3.9	2.0	1.6	52.6
Castroville	1.4	1.7	3.0	4.2	4.6	4.8	4.0	3.8	3.0	2.6	1.6	1.4	36.2
Gonzales	1.3	1.7	3.4	4.7	5.4	6.3	6.3	5.9	4.4	3.4	1.9	1.3	45.7
MONTEREY													
Greenfield	1.8	2.2	3.4	4.8	5.6	6.3	6.5	6.2	4.8	3.7	2.4	1.8	49.5
King City	1.7	2.0	3.4	4.4	4.4	5.6	6.1	6.7	6.5	5.2	2.2	1.3	49.6
King City-Oasis Rd.	1.4	1.9	3.6	5.3	6.5	7.3	7.4	6.8	5.1	4.0	2.0	1.5	52.7
Long Valley	1.5	1.9	3.2	4.1	5.8	6.5	7.3	6.7	5.3	3.6	2.0	1.2	49.1
Monterey	1.7	1.8	2.7	3.5	4.0	4.1	4.3	4.2	3.5	2.8	1.9	1.5	36.0
Pajaro	1.8	2.2	3.7	4.8	5.3	5.7	5.6	5.3	4.3	3.4	2.4	1.8	46.1
Salinas	1.6	1.9	2.7	3.8	4.8	4.7	5.0	4.5	4.0	2.9	1.9	1.3	39.1
Salinas North	1.2	1.5	2.9	4.1	4.6	5.2	4.5	4.3	3.2	2.8	1.5	1.2	36.9
San Ardo	1.0	1.7	3.1	4.5	5.9	7.2	8.1	7.1	5.1	3.1	1.5	1.0	49.0
San Juan	1.8	2.1	3.4	4.6	5.3	5.7	5.5	4.9	3.8	3.2	2.2	1.9	44.2
Soledad	1.7	2.0	3.4	4.4	5.5	5.4	6.5	6.2	5.2	3.7	2.2	1.5	47.7
NAPA													
Angwin	1.8	1.9	3.2	4.7	5.8	7.3	8.1	7.1	5.5	4.5	2.9	2.1	54.9
Carneros	0.8	1.5	3.1	4.6	5.5	6.6	6.9	6.2	4.7	3.5	1.4	1.0	45.8
Oakville	1.0	1.5	2.9	4.7	5.8	6.9	7.2	6.4	4.9	3.5	1.6	1.2	47.7
St Helena	1.2	1.5	2.8	3.9	5.1	6.1	7.0	6.2	4.8	3.1	1.4	0.9	44.1
Yountville	1.3	1.7	2.8	3.9	5.1	6.0	7.1	6.1	4.8	3.1	1.5	0.9	44.3
NEVADA													
Grass Valley	1.1	1.5	2.6	4.0	5.7	7.1	7.9	7.1	5.3	3.2	1.5	0.9	48.0
Nevada City	1.1	1.5	2.6	3.9	5.8	6.9	7.9	7.0	5.3	3.2	1.4	0.9	47.4
ORANGE													
Irvine	2.2	2.5	3.7	4.7	5.2	5.9	6.3	6.2	4.6	3.7	2.6	2.3	49.6
Laguna Beach	2.2	2.7	3.4	3.8	4.6	4.6	4.9	4.9	4.4	3.4	2.4	2.0	43.2
Santa Ana	2.2	2.7	3.7	4.5	4.6	5.4	6.2	6.1	4.7	3.7	2.5	2.0	48.2
PLACER													
Auburn	1.2	1.7	2.8	4.4	6.1	7.4	8.3	7.3	5.4	3.4	1.6	1.0	50.6
Blue Canyon	0.7	1.1	2.1	3.4	4.8	6.0	7.2	6.1	4.6	2.9	0.9	0.6	40.5
Colfax	1.1	1.5	2.6	4.0	5.8	7.1	7.9	7.0	5.3	3.2	1.4	0.9	47.9
Roseville	1.1	1.7	3.1	4.7	6.2	7.7	8.5	7.3	5.6	3.7	1.7	1.0	52.2
Soda Springs	0.7	0.7	1.8	3.0	4.3	5.3	6.2	5.5	4.1	2.5	0.7	0.7	35.4
Tahoe City	0.7	0.7	1.7	3.0	4.3	5.4	6.1	5.6	4.1	2.4	0.8	0.6	35.5
Truckee	0.7	0.7	1.7	3.2	4.4	5.4	6.4	5.7	4.1	2.4	0.8	0.6	36.2
PLUMAS													
Portola	0.7	0.9	1.9	3.5	4.9	5.9	7.3	5.9	4.3	2.7	0.9	0.5	39.4
Quincy	0.7	0.9	2.2	3.5	4.9	5.9	7.3	5.9	4.4	2.8	1.2	0.5	40.2
RIVERSIDE													
Beaumont	2.0	2.3	3.4	4.4	6.1	7.1	7.6	7.9	6.0	3.9	2.6	1.7	55.0
Blythe	2.4	3.3	5.3	6.9	8.7	9.6	9.6	8.7	6.9	5.0	3.0	2.2	71.4
Cathedral City	1.6	2.2	3.7	5.1	6.8	7.8	8.7	7.8	5.7	4.0	2.1	1.6	57.1
Coachella	2.9	4.4	6.2	8.4	10.5	11.9	12.3	10.1	8.9	6.2	3.8	2.4	88.1

Appendix A - Reference Evapotranspiration (ETo) Table*													
County and City	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual ETo**
RIVERSIDE													
Desert Center	2.9	4.1	6.4	8.5	11.0	12.1	12.2	11.1	9.0	6.4	3.9	2.6	90.0
Elsinore	2.1	2.8	3.9	4.4	5.9	7.1	7.6	7.0	5.8	3.9	2.6	1.9	55.0
Indio	**3.1**	3.6	6.5	8.3	10.5	11.0	10.8	9.7	8.3	5.9	3.7	2.7	83.9
La Quinta	2.4	2.8	5.2	6.5	8.3	8.7	8.5	7.9	6.5	4.5	2.7	2.2	66.2
Mecca	2.6	3.3	5.7	7.2	8.6	9.0	8.8	8.2	6.8	5.0	3.2	2.4	70.8
Oasis	2.9	3.3	5.3	6.1	8.5	8.9	8.7	7.9	6.9	4.8	2.9	2.3	68.4
Palm Deser	2.5	3.4	5.3	6.9	8.7	9.6	9.6	8.7	6.9	5.0	3.0	2.2	71.6
Palm Springs	2.0	2.9	4.9	7.2	8.3	8.5	11.6	8.3	7.2	5.9	2.7	1.7	71.1
Rancho California	1.8	2.2	3.4	4.8	5.6	6.3	6.5	6.2	4.8	3.7	2.4	1.8	49.5
Rancho Mirage	2.4	3.3	5.3	6.9	8.7	9.6	9.6	8.7	6.9	5.0	3.0	2.2	71.4
Ripley	2.7	3.3	5.6	7.2	8.7	8.7	8.4	7.6	6.2	4.6	2.8	2.2	67.8
Salton Sea North	2.5	3.3	5.5	7.2	8.8	9.3	9.2	8.5	6.8	5.2	3.1	2.3	71.7
Temecula East II	2.3	2.4	4.1	4.9	6.4	7.0	7.8	7.4	5.7	4.1	2.6	2.2	56.7
Thermal	2.4	3.3	5.5	7.6	9.1	9.6	9.3	8.6	7.1	5.2	3.1	2.1	72.8
Riverside UC	2.5	2.9	4.2	5.3	5.9	6.6	7.2	6.9	5.4	4.1	2.9	2.6	56.4
Winchester	2.3	2.4	4.1	4.9	6.4	6.9	7.7	7.5	6.0	3.9	2.6	2.1	56.8
SACRAMENTO													
Fair Oaks	1.0	1.6	3.4	4.1	6.5	7.5	8.1	7.1	5.2	3.4	1.5	1.0	50.5
Sacramento	1.0	1.8	3.2	4.7	6.4	7.7	8.4	7.2	5.4	3.7	1.7	0.9	51.9
Twitchell Island	1.2	1.8	3.9	5.3	7.4	8.8	9.1	7.8	5.9	3.8	1.7	1.2	57.9
SAN BENITO													
Hollister	1.5	1.8	3.1	4.3	5.5	5.7	6.4	5.9	5.0	3.5	1.7	1.1	45.1
San Benito	1.2	1.6	3.1	4.6	5.6	6.4	6.9	6.5	4.8	3.7	1.7	1.2	47.2
San Juan Valley	1.4	1.8	3.4	4.5	6.0	6.7	7.1	6.4	5.0	3.5	1.8	1.4	49.1
SAN BERNARDINO													
Baker	2.7	3.9	6.1	8.3	10.4	11.8	12.2	11.0	8.9	6.1	3.3	2.1	86.6
Barstow NE	2.2	2.9	5.3	6.9	9.0	10.1	9.9	8.9	6.8	4.8	2.7	2.1	71.7
Big Bear Lake	1.8	2.6	4.6	6.0	7.0	7.6	8.1	7.4	5.4	4.1	2.4	1.8	58.6
Chino	2.1	2.9	3.9	4.5	5.7	6.5	7.3	7.1	5.9	4.2	2.6	2.0	54.6
Crestline	1.5	1.9	3.3	4.4	5.5	6.6	7.8	7.1	5.4	3.5	2.2	1.6	50.8
Lake Arrowhead	1.8	2.6	4.6	6.0	7.0	7.6	8.1	7.4	5.4	4.1	2.4	1.8	58.6
Lucerne Valley	2.2	2.9	5.1	6.5	9.1	11.0	11.4	9.9	7.4	5.0	3.0	1.8	75.3
Needles	3.2	4.2	6.6	8.9	11.0	12.4	12.8	11.0	8.9	6.6	4.0	2.7	92.1
Newberry Springs	2.1	2.9	5.3	8.4	9.8	10.9	11.1	9.9	7.6	5.2	3.1	2.0	78.2
San Bernardino	2.0	2.7	3.8	4.6	5.7	6.9	7.9	7.4	5.9	4.2	2.6	2.0	55.6
Twentynine Palms	2.6	3.6	5.9	7.9	10.1	11.2	11.2	10.3	8.6	5.9	3.4	2.2	82.9
Victorville	2.0	2.6	4.6	6.2	7.3	8.9	9.8	9.0	6.5	4.7	2.7	2.1	66.2
SAN DIEGO													
Chula Vista	2.2	2.7	3.4	3.8	4.9	4.7	5.5	4.9	4.5	3.4	2.4	2.0	44.2
Escondido SPV	2.4	2.6	3.9	4.7	5.9	6.5	7.1	6.7	5.3	3.9	2.8	2.3	54.2
SAN DIEGO													
Miramar	2.3	2.5	3.7	4.1	5.1	5.4	6.1	5.8	4.5	3.3	2.4	2.1	47.1
Oceanside	2.2	2.7	3.4	3.7	4.9	4.6	4.6	5.1	4.1	3.3	2.4	2.0	42.9
Otay Lake	2.3	2.7	3.9	4.6	5.6	5.9	6.2	6.1	4.8	3.7	2.6	2.2	50.4
Pine Valley	1.5	2.4	3.8	5.1	6.0	7.0	7.8	7.3	6.0	4.0	2.2	1.7	54.8
Ramona	2.1	2.1	3.4	4.6	5.2	6.3	6.7	6.8	5.3	4.1	2.8	2.1	51.6
San Diego	2.1	2.4	3.4	4.6	5.1	5.3	5.7	5.6	4.3	3.6	2.4	2.0	46.5
Santee	2.1	2.7	3.7	4.5	5.5	6.1	6.6	6.2	5.4	3.8	2.6	2.0	51.1
Torrey Pines	2.2	2.3	3.4	3.9	4.0	4.1	4.6	4.7	3.8	2.8	2.0	2.0	39.8
Warner Springs	1.6	2.7	3.7	4.7	5.7	7.6	8.3	7.7	6.3	4.0	2.5	1.3	56.0

Appendix A - Reference Evapotranspiration (ETo) Table*													
County and City	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual ETo**
SAN FRANCISCO													
San Francisco	1.5	1.3	2.4	3.0	3.7	4.6	4.9	4.8	4.1	2.8	1.3	0.7	35.1
SAN JOAQUIN													
Farmington	1.5	1.5	2.9	4.7	6.2	7.6	8.1	6.8	5.3	3.3	1.4	0.7	50.0
Lodi West	1.0	1.6	3.3	4.3	6.3	6.9	7.3	6.4	4.5	3.0	1.4	0.8	46.7
Manteca	0.9	1.7	3.4	5.0	6.5	7.5	8.0	7.1	5.2	3.3	1.6	0.9	51.2
Stockton	0.8	1.5	2.9	4.7	6.2	7.4	8.1	6.8	5.3	3.2	1.4	0.6	49.1
Tracy	1.0	1.5	2.9	4.5	6.1	7.3	7.9	6.7	5.3	3.2	1.3	0.7	48.5
SAN LUIS OBISPO													
Arroyo Grande	2.0	2.2	3.2	3.8	4.3	4.7	4.3	4.6	3.8	3.2	2.4	1.7	40.0
Atascadero	1.2	1.5	2.8	3.9	4.5	6.0	6.7	6.2	5.0	3.2	1.7	1.0	43.7
Morro Bay	2.0	2.2	3.1	3.5	4.3	4.5	4.6	4.6	3.8	3.5	2.1	1.7	39.9
Nipomo	2.2	2.5	3.8	5.1	5.7	6.2	6.4	6.1	4.9	4.1	2.9	2.3	52.1
Paso Robles	1.6	2.0	3.2	4.3	5.5	6.3	7.3	6.7	5.1	3.7	2.1	1.4	49.0
San Luis Obispo	2.0	2.2	3.2	4.1	4.9	5.3	4.6	5.5	4.4	3.5	2.4	1.7	43.8
San Miguel	1.6	2.0	3.2	4.3	5.0	6.4	7.4	6.8	5.1	3.7	2.1	1.4	49.0
San Simeon	2.0	2.0	2.9	3.5	4.2	4.4	4.6	4.3	3.5	3.1	2.0	1.7	38.1
SAN MATEO													
Hal Moon Bay	1.5	1.7	2.4	3.0	3.9	4.3	4.3	4.2	3.5	2.8	1.3	1.0	33.7
Redwood City	1.5	1.8	2.9	3.8	5.2	5.3	6.2	5.6	4.8	3.1	1.7	1.0	42.8
Woodside	1.8	2.2	3.4	4.8	5.6	6.3	6.5	6.2	4.8	3.7	2.4	1.8	49.5
SANTA BARBARA													
Betteravia	2.1	2.6	4.0	5.2	6.0	5.9	5.8	5.4	4.1	3.3	2.7	2.1	49.1
Carpenteria	2.0	2.4	3.2	3.9	4.8	5.2	5.5	5.7	4.5	3.4	2.4	2.0	44.9
Cuyama	2.1	2.4	3.8	5.4	6.9	7.9	8.5	7.7	5.9	4.5	2.6	2.0	59.7
Goleta	2.1	2.5	3.9	5.1	5.7	5.7	5.4	5.4	4.2	3.2	2.8	2.2	48.1
Goleta Foothills	2.3	2.6	3.7	5.4	5.3	5.6	5.5	5.7	4.5	3.9	2.8	2.3	49.6
Guadalupe	2.0	2.2	3.2	3.7	4.9	4.6	4.5	4.6	4.1	3.3	2.4	1.7	41.1
Lompoc	2.0	2.2	3.2	3.7	4.8	4.6	4.9	4.8	3.9	3.2	2.4	1.7	41.1
Los Alamos	1.8	2.0	3.2	4.1	4.9	5.3	5.7	5.5	4.4	3.7	2.4	1.6	44.6
Santa Barbara	2.0	2.5	3.2	3.8	4.6	5.1	5.5	4.5	3.4	2.4	1.8	1.8	40.6
SANTA BARBARA													
Santa Maria	1.8	2.3	3.7	5.1	5.7	5.8	5.6	5.3	4.2	3.5	2.4	1.9	47.4
Santa Ynez	1.7	2.2	3.5	5.0	5.8	6.2	6.4	6.0	4.5	3.6	2.2	1.7	48.7
Sisquoc	2.1	2.5	3.8	4.1	6.1	6.3	6.4	5.8	4.7	3.4	2.3	1.8	49.2
Solvang	2.0	2.0	3.3	4.3	5.0	5.6	6.1	5.6	4.4	3.7	2.2	1.6	45.6
SANTA CLARA													
Gilroy	1.3	1.8	3.1	4.1	5.3	5.6	6.1	5.5	4.7	3.4	1.7	1.1	43.6
Los Gatos	1.5	1.8	2.8	3.9	5.0	5.6	6.2	5.5	4.7	3.2	1.7	1.1	42.9
Morgan Hill	1.5	1.8	3.4	4.2	6.3	7.0	7.1	6.0	5.1	3.7	1.9	1.4	49.5
Palo Alto	1.5	1.8	2.8	3.8	5.2	5.3	6.2	5.6	5.0	3.2	1.7	1.0	43.0
San Jose	1.5	1.8	3.1	4.1	5.5	5.8	6.5	5.9	5.2	3.3	1.8	1.0	45.3
SANTA CRUZ													
De Laveaga	1.4	1.9	3.3	4.7	4.9	5.3	5.0	4.8	3.6	3.0	1.6	1.3	40.8
Green Valley Rd	1.2	1.8	3.2	4.5	4.6	5.4	5.2	5.0	3.7	3.1	1.6	1.3	40.6
Santa Cruz	1.5	1.8	2.6	3.5	4.3	4.4	4.8	4.4	3.8	2.8	1.7	1.2	36.6
Watsonville	1.5	1.8	2.7	3.7	4.6	4.5	4.9	4.2	4.0	2.9	1.8	1.2	37.7
Webb	1.8	2.2	3.7	4.8	5.3	5.7	5.6	5.3	4.3	3.4	2.4	1.8	46.2

Appendix A - Reference Evapotranspiration (ETo) Table*													
County and City	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual ETo**
SHASTA													
Burney	0.7	1.0	2.1	3.5	4.9	5.9	7.4	6.4	4.4	2.9	0.9	0.6	40.9
Fall River Mills	0.6	1.0	2.1	3.7	5.0	6.1	7.8	6.7	4.6	2.8	0.9	0.5	41.8
Glenburn	0.6	1.0	2.1	3.7	5.0	6.3	7.8	6.7	4.7	2.8	0.9	0.6	42.1
McArthur	0.7	1.4	2.9	4.2	5.6	6.9	8.2	7.2	5.0	3.0	1.1	0.6	46.8
Redding	1.2	1.4	2.6	4.1	5.6	7.1	8.5	7.3	5.3	3.2	1.4	0.9	48.8
SIERRA													
Downieville	0.7	1.0	2.3	3.5	5.0	6.0	7.4	6.2	4.7	2.8	0.9	0.6	41.3
Sierraville	0.7	1.1	2.2	3.2	4.5	5.9	7.3	6.4	4.3	2.6	0.9	0.5	39.6
SISKIYOU													
Happy Camp	0.5	0.9	2.0	3.0	4.3	5.2	6.1	5.3	4.1	2.4	0.9	0.5	35.1
MacDoel	1.0	1.7	3.1	4.5	5.9	7.2	8.1	7.1	5.1	3.1	1.5	1.0	49.0
Mt Shasta	0.5	0.9	2.0	3.0	4.5	5.3	6.7	5.7	4.0	2.2	0.7	0.5	36.0
Tule lake FS	0.7	1.3	2.7	4.0	5.4	6.3	7.1	6.4	4.7	2.8	1.0	0.6	42.9
Weed	0.5	0.9	2.0	2.5	4.5	5.3	6.7	5.5	3.7	2.0	0.9	0.5	34.9
Yreka	0.6	0.9	2.1	3.0	4.9	5.8	7.3	6.5	4.3	2.5	0.9	0.5	39.2
SOLANO													
Dixon	0.7	1.4	3.2	5.2	6.3	7.6	8.2	7.2	5.5	4.3	1.6	1.1	52.1
Fairfield	1.1	1.7	2.8	4.0	5.5	6.1	7.8	6.0	4.8	3.1	1.4	0.9	45.2
Hastings Tract	1.6	2.2	3.7	5.1	6.8	7.8	8.7	7.8	5.7	4.0	2.1	1.6	57.1
Putah Creek	1.0	1.6	3.2	4.9	6.1	7.3	7.9	7.0	5.3	3.8	1.8	1.2	51.0
Rio Vista	0.9	1.7	2.8	4.4	5.9	6.7	7.9	6.5	5.1	3.2	1.3	0.7	47.0
Suisun Valley	0.6	1.3	3.0	4.7	5.8	7.0	7.7	6.8	5.3	3.8	1.4	0.9	48.3
Winters	0.9	1.7	3.3	5.0	6.4	7.5	7.9	7.0	5.2	3.5	1.6	1.0	51.0
SONOMA													
Bennett Valley	1.1	1.7	3.2	4.1	5.5	6.5	6.6	5.7	4.5	3.1	1.5	0.9	44.4
Cloverdale	1.1	1.4	2.6	3.4	5.0	5.9	6.2	5.6	4.5	2.8	1.4	0.7	40.7
Fort Ross	1.2	1.4	2.2	3.0	3.7	4.5	4.2	4.3	3.4	2.4	1.2	0.5	31.9
Healdsburg	1.2	1.5	2.4	3.5	5.0	5.9	6.1	5.6	4.5	2.8	1.4	0.7	40.8
Lincoln	1.2	1.7	2.8	4.7	6.1	7.4	8.4	7.3	5.4	3.7	1.9	1.2	51.9
Petaluma	1.2	1.5	2.8	3.7	4.6	5.6	4.6	5.7	4.5	2.9	1.4	0.9	39.6
Santa Rosa	1.2	1.7	2.8	3.7	5.0	6.0	6.1	5.9	4.5	2.9	1.5	0.7	42.0
Valley of the Moon	1.0	1.6	3.0	4.5	5.6	6.6	7.1	6.3	4.7	3.3	1.5	1.0	46.1
Windsor	0.9	1.6	3.0	4.5	5.5	6.5	6.5	5.9	4.4	3.2	1.4	1.0	44.2
Denair	1.0	1.9	3.6	4.7	7.0	7.9	8.0	6.1	5.3	3.4	1.5	1.0	51.4
La Grange	1.2	1.5	3.1	4.7	6.2	7.7	8.5	7.3	5.3	3.4	1.4	0.7	51.2
Modesto	0.9	1.4	3.2	4.7	6.4	7.7	8.1	6.8	5.0	3.4	1.4	0.7	49.7
Newman	1.0	1.5	3.2	4.6	6.2	7.4	8.1	6.7	5.0	3.4	1.4	0.7	49.3
STANISLAUS													
Oakdale	1.2	1.5	3.2	4.7	6.2	7.7	8.1	7.1	5.1	3.4	1.4	0.7	50.3
Patterson	1.3	2.1	4.2	5.4	7.9	8.6	8.2	6.6	5.8	4.0	1.9	1.3	57.3
Turlock	0.9	1.5	3.2	4.7	6.5	7.7	8.2	7.0	5.1	3.4	1.4	0.7	50.2
SUTTER													
Nicolaus	0.9	1.6	3.2	4.9	6.3	7.5	8.0	6.9	5.2	3.4	1.5	0.9	50.2
Yuba City	1.3	2.1	2.8	4.4	5.7	7.2	7.1	6.1	4.7	3.2	1.2	0.9	46.7
TEHAMA													
Corning	1.2	1.8	2.9	4.5	6.1	7.3	8.1	7.2	5.3	3.7	1.7	1.1	50.7
Gerber	1.0	1.8	3.5	5.0	6.6	7.9	8.7	7.4	5.8	4.1	1.8	1.1	54.7
Gerber Dryland	0.9	1.6	3.2	4.7	6.7	8.4	9.0	7.9	6.0	4.2	2.0	1.0	55.5
Red Bluff	1.2	1.8	2.9	4.4	5.9	7.4	8.5	7.3	5.4	3.5	1.7	1.0	51.1

Appendix A - Reference Evapotranspiration (ETo) Table*													
County and City	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual ETo**
TRINITY													
Hay Fork	0.5	1.1	2.3	3.5	4.9	5.9	7.0	6.0	4.5	2.8	0.9	0.7	40.1
Weaverville	0.6	1.1	2.2	3.3	4.9	5.9	7.3	6.0	4.4	2.7	0.9	0.7	40.0
TULARE													
Alpaugh	0.9	1.7	3.4	4.8	6.6	7.7	8.2	7.3	5.4	3.4	1.4	0.7	51.6
Badger	1.0	1.3	2.7	4.1	6.0	7.3	7.7	7.0	4.8	3.3	1.4	0.7	47.3
Delano	1.1	1.9	4.0	4.9	7.2	7.9	8.1	7.3	5.4	3.2	1.5	1.2	53.6
Dinuba	1.1	1.5	3.2	4.7	6.2	7.7	8.5	7.3	5.3	3.4	1.4	0.7	51.2
Lindcove	0.9	1.6	3.0	4.8	6.5	7.6	8.1	7.2	5.2	3.4	1.6	0.9	50.6
Porterville	1.2	1.8	3.4	4.7	6.6	7.7	8.5	7.3	5.3	3.4	1.4	0.7	52.1
Visalia	0.9	1.7	3.3	5.1	6.8	7.7	7.9	6.9	4.9	3.2	1.5	0.8	50.7
TUOLUMNE													
Groveland	1.1	1.5	2.8	4.1	5.7	7.2	7.9	6.6	5.1	3.3	1.4	0.7	47.5
Sonora	1.1	1.5	2.8	4.1	5.8	7.2	7.9	6.7	5.1	3.2	1.4	0.7	47.6
VENTURA													
Camarillo	2.2	2.5	3.7	4.3	5.0	5.2	5.9	5.4	4.2	3.0	2.5	2.1	46.1
Oxnard	2.2	2.5	3.2	3.7	4.4	4.6	5.4	4.8	4.0	3.3	2.4	2.0	42.3
Piru	2.8	2.8	4.1	5.6	6.0	6.8	7.6	7.8	5.8	5.2	3.7	3.2	61.5
Port Hueneme	2.0	2.3	3.3	4.6	4.9	4.9	4.9	5.0	3.7	3.2	2.5	2.2	43.5
Thousand Oaks	2.2	2.6	3.4	4.5	5.4	5.9	6.7	6.4	5.4	3.9	2.6	2.0	51.0
Ventura	2.2	2.6	3.2	3.8	4.6	4.7	5.5	4.9	4.1	3.4	2.5	2.0	43.5
YOLO													
Bryte	0.9	1.7	3.3	5.0	6.4	7.5	7.9	7.0	5.2	3.5	1.6	1.0	51.0
Davis	1.0	1.9	3.3	5.0	6.4	7.6	8.2	7.1	5.4	4.0	1.8	1.0	52.5
Esparto	1.0	1.7	3.4	5.5	6.9	8.1	8.5	7.5	5.8	4.2	2.0	1.2	55.8
Winters	1.7	1.7	2.9	4.4	5.8	7.1	7.9	6.7	5.3	3.3	1.6	1.0	49.4
Woodland	1.0	1.8	3.2	4.7	6.1	7.7	8.2	7.2	5.4	3.7	1.7	1.0	51.6
Zamora	1.1	1.9	3.5	5.2	6.4	7.4	7.8	7.0	5.5	4.0	1.9	1.2	52.8
YUBA													
Browns Valley	1.0	1.7	3.1	4.7	6.1	7.5	8.5	7.6	5.7	4.1	2.0	1.1	52.9
Brownsville	1.1	1.4	2.6	4.0	5.7	6.8	7.9	6.8	5.3	3.4	1.5	0.9	47.4
* The values in this table were derived from:													
1) California Irrigation Management Information System (CIMIS);													
2) Reference EvapoTranspiration Zones Map, UC Dept. of Land, Air & Water Resources and													
California Dept of Water Resources 1999; and													
3) Reference Evapotranspiration for California, University of California, Department of Agriculture													
and Natural Resources (1987) Bulletin 1922 4) Determining Daily Reference Evapotranspiration,													
Cooperative Extension UC Division of Agriculture and Natural Resources (1987),													
Publication Leaflet 21426													

Appendix B – Sample Water Efficient Landscape Worksheet.

WATER EFFICIENT LANDSCAPE WORKSHEET

This worksheet is filled out by the project applicant and it is a required element of the Landscape Documentation Package.
Please complete all sections (A and B) of the worksheet.

SECTION A. HYDROZONE INFORMATION TABLE

Please complete the hydrozone table(s) for each hydrozone. Use as many tables as necessary to provide the square footage of landscape area per hydrozone.

Hydrozone*	Zone or Valve	Irrigation Method**	Area (Sq. Ft.)	% of Landscape Area
	Total			**100%**

**** Hydrozone***
HW = High Water Use Plants
MW = Moderate Water Use Plants
LW = Low Water Use Plants

*****Irrigation Method***
MS = Micro-spray
S = Spray
R = Rotor
B= Bubbler
D= Drip
O = Other

SECTION B. WATER BUDGET CALCULATIONS

Section B1. Maximum Applied Water Allowance (MAWA)

The project's Maximum Applied Water Allowance shall be calculated using this equation:

MAWA = (ETo) (0.62) [(0.7 x LA) + (0.3 x SLA)]

where:

MAWA = Maximum Applied Water Allowance (gallons per year)
ETo = Reference Evapotranspiration from Appendix A (inches per year)
0.7 = ET Adjustment Factor (ETAF)
LA = Landscaped Area includes Special Landscape Area (square feet)
0.62 = Conversion factor (to gallons per square foot)
SLA = Portion of the landscape area identified as Special Landscape Area (square feet)
0.3 = the additional ET Adjustment Factor for Special Landscape Area (1.0 - 0.7 = 0.3)

Maximum Applied Water Allowance = _____**gallons per year**

Show calculations.

Effective Precipitation (Eppt)

If considering Effective Precipitation, use 25% of annual precipitation. Use the following equation to calculate Maximum Applied Water Allowance:

MAWA= (ETo – Eppt) (0.62) [(0.7 x LA) + (0.3 x SLA)]

Maximum Applied Water Allowance = _____**gallons per year**

Show calculations.

Section B2. Estimated Total Water Use (ETWU)

The project's Estimated Total Water Use is calculated using the following formula:

$$ETWU = (ETo)(0.62)\left(\frac{PF\,x\,HA}{IE} + SLA\right)$$

where:

ETWU = Estimated total water use per year (gallons per year)
ETo = Reference Evapotranspiration (inches per year)
PF = Plant Factor from WUCOLS (see Definitions)
HA = Hydrozone Area [high, medium, and low water use areas] (square feet)
SLA = Special Landscape Area (square feet)
0.62 = Conversion Factor (to gallons per square foot)
IE = Irrigation Efficiency (minimum 0.71)

Hydrozone Table for Calculating ETWU

Please complete the hydrozone table(s). Use as many tables as necessary.

Hydrozone	Plant Water Use Type(s)	Plant Factor (PF)	Area (HA) (square feet)	PF x HA (square feet)
			Sum	
	SLA			

Estimated Total Water Use = _____**gallons**

Show calculations.

Appendix C – Sample Certificate of Completion.

CERTIFICATE OF COMPLETION

This certificate is filled out by the project applicant upon completion of the landscape project.

PART 1. PROJECT INFORMATION SHEET

Date		
Project Name		
Name of Project Applicant	Telephone No.	
	Fax No.	
Title	Email Address	
Company	Street Address	
City	State	Zip Code

Project Address and Location:

Street Address		Parcel, tract or lot number, if available.
City		Latitude/Longitude (optional)
State	Zip Code	

Property Owner or his/her designee:

Name	Telephone No.	
	Fax No.	
Title	Email Address	
Company	Street Address	
City	State	Zip Code

Property Owner

"I/we certify that I/we have received copies of all the documents within the Landscape Documentation Package and the Certificate of Completion and that it is our responsibility to see that the project is maintained in accordance with the Landscape and Irrigation Maintenance Schedule."

_____

Property Owner Signature Date

Please answer the questions below:

1. Date the Landscape Documentation Package was submitted to the local agency_____
2. Date the Landscape Documentation Package was approved by the local agency_____
3. Date that a copy of the Water Efficient Landscape Worksheet (including the Water Budget Calculation) was submitted to the local water purveyor_____

PART 2. CERTIFICATION OF INSTALLATION ACCORDING TO THE LANDSCAPE DOCUMENTATION PACKAGE

"I/we certify that based upon periodic site observations, the work has been substantially completed in accordance with the ordinance and that the landscape planting and irrigation installation conform with the criteria and specifications of the approved Landscape Documentation Package."

<table>
<tr><td>Signature*</td><td colspan="2">Date</td></tr>
<tr><td rowspan="2">Name (print)</td><td colspan="2">Telephone No.</td></tr>
<tr><td colspan="2">Fax No.</td></tr>
<tr><td>Title</td><td colspan="2">Email Address</td></tr>
<tr><td colspan="3">License No. or Certification No.</td></tr>
<tr><td>Company</td><td colspan="2">Street Address</td></tr>
<tr><td>City</td><td>State</td><td>Zip Code</td></tr>
</table>

*****Signer of the landscape design plan, signer of the irrigation plan, or a licensed landscape contractor.

PART 3. IRRIGATION SCHEDULING

Attach parameters for setting the irrigation schedule on controller per ordinance Section 492.10.

PART 4. SCHEDULE OF LANDSCAPE AND IRRIGATION MAINTENANCE

Attach schedule of Landscape and Irrigation Maintenance per ordinance Section 492.11.

PART 5. LANDSCAPE IRRIGATION AUDIT REPORT

Attach Landscape Irrigation Audit Report per ordinance Section 492.12.

PART 6. SOIL MANAGEMENT REPORT

Attach soil analysis report, if not previously submitted with the Landscape Documentation Package per ordinance Section 492.5.

Attach documentation verifying implementation of recommendations from soil analysis report per ordinance Section 492.5.

Appendix E

Draft Water Shortage Resolution and Water Shortage Contingency Plan

RESOLUTION NO. _____

IMPLEMENTATION OF STAGE [I, II, III, OR IV] OF THE CITY OF BRENTWOOD WATER SHORTAGE CONTINGENCY PLAN AS OUTLINED IN THE 2005 URBAN WATER MANAGEMENT PLAN ON FILE WITH THE CALIFORNIA DEPARTMENT OF WATER RESOURCES.

WHEREAS, on January 10, 2006, by Resolution No. 2006-006, City Council approved the 2005 Urban Water Management Plan; and

WHEREAS, the 2005 Urban Water Management Plan includes the Water Shortage Contingency Plan; and

WHEREAS, based on the [describe drought condition], the City of Brentwood City Council hereby declares that a water shortage emergency condition prevails within the water service area of the City and that water use within the City should be reduced by up to [10, 20, 30, 40, 50] percent; and

WHEREAS, required water use reduction described above necessitates implementation of Stage [I, II, III, IV] of the City's Water Shortage Contingency Plan. The water conservation measures and water use restrictions for Stage [I, II, III, IV] are described in the attached Water Shortage Contingency Plan. Implementation of Stage [I, II, III, IV] shall be cumulative and shall include implementation of all previous provisions listed in Stages [I, II, III]; and

WHEREAS, the City Manager is herby authorized and empowered to delegate his or her authority hereunder to such assistants, deputies, officers, employees, or agents of the City as he or she shall designate, and to establish such rules, regulations, and procedures, and to prepare or furnish such forms, as he or she deems necessary or appropriate to carry out the provisions of the Resolution; and

WHEREAS, this Resolution shall be effective upon its adoption, and shall remain effective until the drought conditions are resolved, in which case this Resolution shall be rescinded, or until conditions worsen, thus requiring additional action by the City Council, in which case a subsequent Resolution will be considered for adoption.

NOW, THEREFORE BE IT RESOLVED by the City Council of the City of Brentwood that Stage [I, II, III, IV] of the Water Shortage Contingency Plan is hereby adopted.

PASSED, APPROVED AND ADOPTED by the City Council of the City of Brentwood at a [regular, special] meeting held on the [Day] day of [Month] by the following vote:

WATER SHORTAGE CONTINGENCY PLAN

Table of Contents

List of Tables

Attachments

This document is a Water Shortage Contingency Plan for the City of Brentwood (City) water system. The purpose of this contingency plan is to provide a plan of action to be followed at the various stages of a water shortage.

Section 1. Water Supply Shortage Stages and Conditions

This section describes the stages of action to be undertaken in response to water supply shortages. Included is an outline of specific water supply conditions that are applicable to each stage. Per California Water Code Section 10632 (a), the City has developed four stages of action to be undertaken in response to water supply shortages, including up to a 50 percent reduction in water supply and an outline of specific water supply conditions which are applicable to each stage.

Four stages of action to be taken during a water supply shortage have been developed. The stages will be implemented during water supply shortages according to shortage level, ranging from 5 percent shortage in Stage I to 50 percent shortage in Stage IV. The stage determination and declaration during a water supply shortage will be made by the Public Works Director. Table 1 describes the water supply shortage levels and stages.

Table 1. Water Supply Shortage Stages

Shortage	Stage	Demand Reduction Goal	Type of Program
Minimum 5-10 percent	I	10 percent	Voluntary
Moderate 10-20 percent	II	20 percent	Mandatory Conservation Phase - Voluntary Allotments and/or Mandatory Conservation Rules
Severe 20-35 percent	III	35 percent	Rationing Phase - Allotments and Mandatory Conservation Rules
Critical 35-50 percent	IV	50 percent	Intense Rationing Phase - Allotments and Mandatory Conservation and Rules

During Stage I, water alert conditions are declared and voluntary conservation is encouraged. The City maintains an ongoing public information campaign consisting of distribution of literature, speaking engagements, bill inserts, and conversation messages printed in local newspapers and on the City's internet web page. The drought situation is explained to public and governmental bodies. The City explains other stages and forecast future actions. Also, the City requests voluntary water conservation. Educational programs in area schools are ongoing.

During Stage II of a water supply shortage, the shortage is moderate, 10 to 20 percent, and conservation may be voluntary, consist of allotments, and or include mandatory conservation rules. The severity of actions depends upon the percent shortage. The City aggressively continues it public information and education programs. The City asks for 10 to 20 percent voluntary or mandatory water use reductions. If necessary, the City also supports passage of drought ordinances.

During Stage III of a water supply shortage, the shortage is severe, 20 to 35 percent, and conservation consists of allotments and mandatory conservation rules. This phase becomes effective upon notification by the City that water usage is to be reduced by a mandatory percentage. The City would adopt drought ordinances and implements mandatory reductions. Rate changes are implemented to penalize excess usage.

Water use restriction is put into effect; i.e., prohibited uses can include restrictions on daytime hours for watering, excessive watering resulting in gutter flooding, using hoses without a shutoff device, non-recycling fountains, washing down sidewalks or patios, unrepaired leaks, etc. The City monitors production weekly for compliance with necessary reductions. As a result of a customer consistently abusing use, the City would install a flow restrictor at the water meter.

During Stage IV of a water supply shortage, the shortage is critical, 35 to 50 percent. Conservation consists of allotments and mandatory conservation rules. All steps taken in prior stages are intensified and production is monitored daily for compliance with necessary reductions.

Section 2. Prohibitions

California Water Code Section 10632 (d) requires mandatory prohibitions against specific water use practices that may be considered excessive during water shortages. Since 1992, the City has adopted Municipal Code 17.630, which addresses landscaping and irrigation for new construction of homes, commercial and industrial facilities. This code is included in Appendix F. It requires 90 percent of the plants selected in non-turf areas to be well suited to the climate of Brentwood and require minimal water once established. Up to 10 percent of the plants may be of a non-drought-tolerant nature but must be grouped together and irrigated separately from the drought-tolerant plants. Turf is not allowed on City median strips, in areas less than 8 feet wide and on slopes greater than 4:1. Soil conditioning, irrigation systems and sprinkler heads are all addressed in this ordinance. The landscaping shall be inspected and must be issued a certificate of substantial completion that is submitted to the City. This code is a proactive means of reducing the water demand in the City of Brentwood.

Should drought conditions warrant mandatory reductions, during Stage II of a water supply shortage, the City may adopt and implement an ordinance for mandatory conservation and water restriction plan. This code may require additional tariffs for the City to enforce the plan.

The code may address prohibitions on various wasteful water uses, including, but not limited to, the hose washing of sidewalks and driveways using potable water, cleaning or filling decorative fountains, and allowing plumbing leaks to go uncorrected for more than 72 hours. Table 2 identifies potential prohibitions and the stages during which the prohibition would be voluntary and mandatory.

Table 2. Voluntary and Mandatory Prohibitions

Prohibitions	Stage When Prohibition is Voluntarily Requested	Stage When Prohibition Becomes Mandatory
Cleaning of Streets/sidewalks/walkways/parking areas/patios/porches or verandas	I	II, III, IV
Washing cars	I	II, III, IV
Watering lawns/landscapes	I	II, III, IV
Non-permanent agriculture	I	II, III, IV
Uncorrected plumbing leaks	I	II, III, IV
Gutter flooding	I	II, III, IV
Cleaning/filling/operating/maintaining levels in non-recycling decorative fountains	I	II, III, IV

Section 3. Consumption Reduction Methods

Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply. California Water Code Section 10632 (e) requires the water supplier to provide consumption reduction methods in the most restrictive stages of a water shortage. The City will use the consumption reduction methods proposed in Table 3.

Table 3. Consumption Reduction Methods

Examples of Consumption Reduction Methods	Stage When Method Takes Effect
Demand reduction program	All Stages
Reduce pressure in water lines	
Flow restriction	III, IV
Restrict Building permits	
Restrict for only priority uses	II, III, IV
Use prohibitions	II, III, IV
Water shortage pricing	
Per capita allotment by customer type	III, IV
Plumbing fixture replacement	All Stages
Voluntary rationing	II
Mandatory rationing	III, IV
Incentives to reduce water consumption	
Excess use penalty	III, IV
Water conservation kits	All Stages
Education Program	All Stages
Percentage reduction by customer type	III, IV

Section 4. Reduction Measuring Mechanism

California Water Code Section 10632 (i) requires the water supplier to develop a mechanism for determining actual reductions in water use in the course of carrying out the urban water supply shortage contingency analysis.

Under normal water supply conditions, water production figures are recorded daily within and monitored by the Superintendent during normal water supply conditions. Totals are reported monthly and are incorporated into water supply reports.

The City maintains extensive water use records on individual customer accounts. Exceptionally high usage is identified at meter reading time by the City's electronic meter reading management system. These accounts are investigated for potential water loss or abuse problems.

During all stages of water shortages, daily production figures are reported to and monitored by the Superintendent daily.

Section 5. Penalties or Charges for Excessive Use

Section 10632 (f) of the California Water Code requires a water supplier to penalize or charge for excessive water use, where applicable. The City, after one written warning, shall install a flow-restricting device on the service line of any customer observed by City personnel to be using water for any non-essential or unauthorized use defined in a City ordinance.

An excess use penalty per 100 cubic feet of water used in excess of the applicable allocation during each billing period shall be charged by the City for all service rendered on and after the effective date of an ordinance. Repeated violations of unauthorized water use will result in discontinuance of water service. Penalties and charges and the stage during which they take effect are displayed in Table 4.

Table 4. Penalties and Charges

Examples of Penalties and Charges	Stage When Penalty Takes Effect
Penalties for not reducing consumption	III, IV
Charges for excess use	III, IV
Flat fine	
Charge per unit over allotment	III, IV
Flow restriction	III, IV
Termination of Service	III, IV

Section 6. Worst-Case Scenarios

California Water Code Section 10632 (b) requires an estimate of the minimum water supply availability during each of the next 3 water years based on the driest 3 -year historic sequence for the agency's water supply. Refer to Chapter 3 of the Year 2005 Urban Water Management Plan for this analysis.

Section 7. Preparation for Catastrophic Water Supply Interruption

The Water Code Section 10632 (c) requires actions to be undertaken by the water supplier to prepare for and implement during a catastrophic interruption of water supplies. The City has a Water Quality Emergency Notification Plan in place that coordinates overall response to a disaster. This plan is included as Appendix F.

A catastrophic event that constitutes a proclamation of a water shortage would be any event, either natural or manmade, that causes a severe shortage of water, synonymous with or with greater severity than the Stage III or Stage IV water supply shortage conditions. Facilities are inspected annually for earthquake safety. Auxiliary generators and improvements to the water storage facilities to prevent loss of these facilities during an earthquake or any disaster causing an electric power outage have been budgeted for and installed as part of the annual construction process.

Table 5 is a summary of items discussed regarding the preparation actions for a catastrophe.

Table 5. Preparation Actions for a Catastrophe

Examples of Penalties and Charges	Check if Discussed
Determine what constitutes a proclamation of a water shortage.	X
Stretch existing water storage.	
Obtain additional water supplies.	
Determine where the funding will come from.	X
Contact and coordinate with other agencies.	X
Create an Emergency Response Team/Coordinator.	X
Create a catastrophe preparedness plan.	X
Put employees/contractors on-call.	X
Develop methods to communicate with the public.	X
Develop methods to prepare for water quality interruptions.	X

Section 8. Analysis of Revenue and Expenditure Impacts

Section 10632 (g) of the California Water Code requires an analysis of the impacts of each of the actions taken for conservation and water restriction on the revenues and expenditures of the water supplier. The City will establish memorandum accounts to track expenses and revenue shortfalls caused by both mandatory rationing and voluntary conservation efforts. The City will implement a surcharge to recover revenue shortfalls recorded in their drought memorandum accounts.

Tables 6 and 7 display the Components of Revenue and Expenditure Impacts and summarize if the various components were discussed.

Table 6. Components of Revenue Impact Description

Components	Check if Discussed
Review of rate adjustment	X
Development of reserves	X
Change in quantity of sales	X
Impact on Customer's bill	X
Distribution of customer impacts between customer types	X
Impacts to water supplier of higher rates and penalties	X
Cost recovery reviews	X

Table 7. Components of Expenditure Impact Description

Components	Check if Discussed
Change in quantity of sales	X
Cost recovery reviews	X
Increased staff salaries/overtime	X
Increased costs of new supplies, transfers or exchanges	X
Distribution of customer impacts between customer types	X
Impacts to water supplier of higher rates and penalties	X